14

CONTENTS

PAGE NOS.

NOTICE TO READERS OF THIS BULLETIN ..... Inside Front Cover

SUBJECT DIVISIONS
1 AIRCRAFT AND FLIGHT EQUIPMENT 1
2 ASTRONOMY, GEOPHYSICS, AND GEOGRAPHY 10
3 CHEMICAL WARFARE EQUIPMENT AND MATERIALS 20
4 CHEMISTRY 21
5 COMMUNICATIONS 28
6 DETECTION 29
7 ELECTRICAL EQUIPMENT 32
8 ELECTRONICS AND ELECTRONIC EQUIPMENT 36
9 FLUID MECHANICS 59
10 FUELS AND COMBUSTION 69
11 GROUND TRANSPORTATION EQUIPMENT ..... No Entries
12 GUIDED MISSILES 71
13 INSTALLATIONS AND CONSTRUCTION 76
14 MATERIALS (NON-METALLIC) 79
15 MATHEMATICS 88
16 MEDICAL SCIENCES 95
17 METALLURGY 110
18 MILITARY SCIENCES AND OPERATIONS 120
19 NAVIGATION 121
20 NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY 124
21 NUCLEAR PROPULSION .....
22 ORDNANCE 131
23 PERSONNEL AND TRAINING 134
24 PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES 136
25 PHYSICS 138
26 PRODUCTION AND MANAGEMENT 154
27 PROPULSION SYSTEMS 158
28 PSYCHOLOGY AND HUMAN ENGINEERING 161
29 QUARTERMASTER EQUIPMENT AND SUPPLIES 166
30 RESEARCH AND RESEARCH EQUIPMENT 167
31 SHIPS AND MARINE EQUIPMENT 175
32 MISCELLANEOUS ARTS AND SCIENCES 176
33 TRANSPORTATION ..... No Entries

SUBJECT INDEX NI-1

U.S. GOVERNMENT RESEARCH REPORTS

U.S. DEPARTMENT OF COMMERCE
Luther H. Hodges, *Secretary*

OFFICE OF TECHNICAL SERVICES
Donald A. Schon, *Director*

Issued twice a month. Annual subscription $15 ($3.75 additional for foreign mailing). Single copy $1. Make remittance payable to Superintendent of Documents and mail either to a U.S. Department of Commerce Field Office or to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Address changes should be sent to Superintendent of Documents.

Contents may be reprinted freely. Mention of source will be appreciated.

Use of funds for printing this publication approved by the Director of the Bureau of the Budget, June 30, 1961.

U.S. Government Research Reports

This publication is issued twice a month to announce new reports of research and development released by the Army, Navy, Air Force, Atomic Energy Commission, and other agencies of the Federal Government. Unless otherwise indicated, reports listed are available from the Office of Technical Services. Some are reproduced by photo-offset printing, others by photocopy reproduction.

The first section of *U.S. Government Research Reports* is compiled by the Defense Documentation Center and is called "Technical Abstract Bulletin." (DDC is a Department of Defense agency which services DOD agencies and their contractors with military research information.) The next section is called "Non-Military and Older Military Research Reports." Here are listed new reports of the Atomic Energy Commission, the Office of Saline Water of the Department of Interior, and reports of other civilian agencies of the Government. In addition, this section lists military research reports not to be found in the "TAB." Most of these older military reports have been acquired by OTS in response to specific industry requests.

How To Order Reports

Almost all reports listed in *U.S. Government Research Reports* are available from the Office of Technical Services, U.S. Department of Commerce, Washington, D.C. 20230, or may be ordered through any Department of Commerce Field Office. Prices are given with each entry. Please use the identification numbers (AD number, PB number, AEC series number) and titles of reports when ordering. Prepayment is required.

For reports available from GPO, address your order and make check or money order payable to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

When any report is available from a source other than OTS or GPO, the name and address of that source will be given. Direct your order to that address and not to OTS.

MICROFILM—Any reports available from the Office of Technical Services will be provided in microfilm (35 mm.) on request. The following prices are charged for microfilm: 1 through 20 pages, 80 cents minimum; and 3 cents per page for every page in excess of 20 pages.

CONTENTS (CON.)

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

	Page
ASTRONOMY	S-1
BEHAVIORAL SCIENCES	S-1
BIOLOGICAL SCIENCES	S-2
CHEMISTRY	S-13
EARTH SCIENCES	S-14
ENGINEERING	S-15
FOOD, HANDLING, AND PACKAGING EQUIPMENT	S-25
MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT	S-25
MATERIALS	S-26
MATHEMATICS	S-28
MECHANICS	S-30
METALLURGY	S-35
NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY	S-37
PHYSICS	S-41
RESEARCH METHODS, TECHNIQUES AND EQUIPMENT	S-45
SOCIAL SCIENCES	S-46
MISCELLANEOUS	S-47
AD INDEX	S-49
NUMBER INDEX	S-51
SUBJECT INDEX	S-53

This issue includes:

TAB 64-14

AD 600 000 - AD 600 879

TECHNICAL ABSTRACT BULLETIN

1. AIRCRAFT AND FLIGHT EQUIPMENT

AD-600 053 Div. 1
OTS Price $1.25

Detachment 4, Research and Technology Div., Eglin AFB, Fla.
ENVIRONMENTAL EVALUATION OF THE MODULATED CARRIER WAVE, TUMBLING-AIRFOIL, CRASH POSITION INDICATOR.
by V. L. Reierson, Apr 64, 42p
ATL TDR64 20,

Unclassified report

Descriptors: (*Rescue beacons, Environmental tests), (*Radio beacons, Aircraft equipment), Survival, Electronic equipment, Toughness, Reliability (Electronics).

Laboratory environmental tests were accomplished on a modulated carrier wave, crash position indicator (CPI) beacon during October, November, and December 1963. These tests included low and high temperature, high altitude, humidity, salt spray, vibration, shock, and life tests. Temperatures from -54 C to +65 C and simulated altitudes to 80,000 ft were used. The beacon survived all tests without permanent deterioration or damage. Temporary deterioration of beacon performance did occur at extremely low temperatures; however, beacon performance recovered completely at ambient temperature. The beacon was tested at and is considered acceptable for storage from -54 C to +65 C to 80,000 ft and for operation from -35 C to +65 C at altitudes to 50,000 ft under the humidity, salt spray, vibration, and shock impact conditions specified in MIL-T-5422E. Recommendations are made for increased quality control by the manufacturer and for operational utilization of a limited number of CPI's on jet aircraft to determine the effects of long term storage under jet aircraft operating conditions. (Author)

AD-600 093 Div. 1
OTS Price $3.00

Federal Aviation Agency, Washington, D. C.
INTERNATIONAL AVIATION R AND D SYMPOSIUM (2nd): ALL WEATHER LANDING SYSTEMS, SEPTEMBER 16-18, 1963.
Summary of discussions and program progress rept.
1964, 186p
FAA

Unclassified report

Descriptors: (*All-weather aviation, Aircraft landings), (*Air traffic control systems, Landing aids), (*Symposia, All-weather aviation), Aviation safety, Terminal flight facilities, Flight instruments, Aircraft antennas, Flight paths, Meteorological parameters.

Contents: summary of discussions, airborne systems, subsystem development, operational aspects; program progress report(FAA all weather landing program, turbojet configuration for category III operation, new glide slope antennae, weather requirements for all weather landing system, visual aids system for all weather operations).

AD-600 108 Div. 1, 2
OTS Price $6.60

Bolley (E) Associates, Inc., Goleta, Calif.
CONFIGURATION OF WEATHER FACILITIES FOR METROPLEX TERMINAL AREAS.
Final rept.
by W. Slover. Jan 64, 91p
Contract ARDS554, Proj. 206 001S,
FAA RD64 32

Unclassified report

Descriptors: (*Weather forecasting, Terminal flight facilities), (*Terminal flight facilities, Weather forecasting), All-weather aviation, Air traffic control terminal areas, Data transmission systems, Design, Operation.

This study develops the observing and communication details of a mesoscale weather network to support the air traffic control system in high-density terminal areas. The study begins with a review of terminal-area traffic control functions and required weather information. Required information includes short period forecasts (one hour) for the terminal area; since such forecasts are not available today, the study considers observations to be their equivalent and makes provision for observing the parameters that will likely be inputs to short period forecasting models. Nine metroplex cities are then selected for study, along with the test-bed at NAFEC. The 'ideal' mesoscale network is described and its principles applied to the ten terminal areas being considered. The problems that exist in obtaining needed meteorological measurements are considered, and an optimum remote observing configuration, using existing meteorological sensors, is discussed. Additional measurements needed at the metroplex terminal are also considered. Finally, the engineering configuration and operation of the data collection network is described. Observing site details and terminal area data for the ten sample locations are tabulated in an appendix. (Author)

AD-600 109 Div. 1, 2
OTS Price $6.60

Bolley (E) Associates, Inc., Goleta, Calif.
NATIONAL AVIATION METEOROLOGICAL REQUIREMENTS THROUGH 1975.
Final rept.
by D. Zopf. Feb 64, 65p
Contract FA WA4403, Proj. 201 002S,
FAA RD64-31

Unclassified report

Descriptors: (*All-weather aviation, Meteorological parameters), (*Weather forecasting, Aviation safety), Air traffic control systems, Standards.

This report is the first up-dating of detailed operational requirements for aviation weather service. The FAA's National Aviation Meteorological Requirements Through 1975-issued in October 1961 has been modified in content, where necessary. In addition, sections have been added which (1) define the relative priority of different services, products, and meteorological parameters in aviation operations, (2) discuss user application of forecast accuracy information, (3) define operational weather products and their distribution.

FEDERAL REGIONAL TECHNICAL REPORT CENTERS

Each of the Federal Regional Technical Report Centers listed below contains a collection of USAEC, NASA, and DOD unclassified reports as well as reports of other U. S. government agencies and provides reference, interlibrary loan, and reproduction services.

University of California
General Library
Berkeley, Calif. 94704

University of California
University Library
Los Angeles, Calif. 90024

Library of Congress
Science and Technology Division
Washington, D. C. 20540

Georgia Institute of Technology
Price Gilbert Library
Atlanta, Ga. 30300

The John Crerar Library
35 West 33rd St.
Chicago, Ill. 60616

Massachusetts Institute of Technology
M. I. T. Libraries
Cambridge, Mass. 02139

Linda Hall Library
5109 Cherry Street
Kansas City, Mo. 64100

Columbia University
Engineering Library
Seeley W. Mudd Building
New York, N. Y. 10027

Carnegie Library of Pittsburgh
4400 Forbes St.
Pittsburgh, Pa. 15213

Southern Methodist University
Science Library
P. O. Box 1339
Dallas, Tex. 75222

University of Colorado
Boulder, Colo. 80301

University of Washington Library
Government Documents Center
Seattle, Wash. 98105

Some PB reports listed as available from OTS may be examined at the following libraries:

Buffalo and Erie County Public Library
Buffalo, N. Y. 14200

University of Cincinnati
Cincinnati, Ohio 45200

Detroit Public Library
Detroit, Michigan 48200

University of Utah
Salt Lake City, Utah 84100

The following Cumulative Indexes for U. S. Government Research Reports are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., 20402:

Volume 32	July - December 1959	$1.00
Volume 33	January - June 1960	$1.00
Volume 34	July - December 1960	$1.00
Volume 35	January - June 1961	$1.00
Volume 36	July - December 1961	$3.50
Volume 37	Semi-annual Cumulative Index January - June 1962 Includes both Technical Abstract Bulletin (TAB) and "Non-Military and Older Military Reports" sections.	$3.50
Volume 37	Semi-annual Cumulative Index July - December 1962 Includes Technical Abstract Bulletin only.	$3.50
Volume 37	Annual Cumulative Index January - December 1962 Includes "Non-Military and Older Military Research Reports" section only.	$1.00
Volume 38	Collective Index 1 January - 1 May 1963 Includes Technical Abstract Bulletin only.	$3.50

For information regarding the availability of earlier indexes write to Office of Technical Services, U. S. Department of Commerce, Washington, D. C. 20230.

Four basic material compositions were used in studies of vibration damping and adhesive stress reduction for alleviation of sonic fatigue. Variations of these four compositions were prepared by changing the ratios of the basic components and by the addition of different percentages of glass or aluminum flake pigments. Test panels simulating aircraft structures were exposed to an overall sound level of 158 decibels in a random noise generator. Best protection against sonic fatigue was obtained by adhesive damping in areas of structural attachment. Measurements of stress reduction in adhesion panels instrumented with a strain gage showed good results with materials compounded with glass or aluminum flake pigments. A polysulfide dispersion and a nylon-epoxy composition were used as the base compounds in these tests. Vibration damping tests were conducted with coated vibration strips with strain gages attached. An attempt was made to correlate dynamic physical properties of the damping compounds, such as creep and recovery, with damping efficiency. Loss moduli values were low for all materials tested but a very significant increase was obtained by the addition of flake pigments. (Author)

AD-600 215 Div. 1, 14, 26
OTS Price $9.10

Narmco Industries, Inc., San Diego, Calif.
FILAMENT-WOUND PRESSURE VESSELS.
Final rept., 5 Sep 62-5 Dec 63
by Frank Wilson. Dec 63, 103p
Contract AF34 601 14053

Unclassified report

Descriptors: (*Pressure vessels, Filament wound construction), (*Filament wound construction, Pressure vessels), Aircraft equipment, Gas cylinders, Composite materials, Glass textiles, Winding, Geometric forms, Performance (Engineering), Standards, High-pressure research.

Air pressure storage vessels are required in high-performance aircraft to perform various emergency functions. Glass filament-wound bottles afford a substantial weight savings over steel, and are less subject to corrosion problems. However, they have been subject to fatigue failures because of the stresses imposed on the relatively weak resin binder system. By redesigning the spherical bottle to a cylindrical shape having isotensoid dome ends, and by using the MultiShell method of fabrication, a weight savings of 10% to 15% coupled with an increase in ultimate burst pressures of 15% to 30% has resulted. This redesigning takes advantage of the unidirectional strength characteristics of the glass filament and reduces the stress on the resin binder system to an acceptable level. Results of comparative testing on the redesigned vessels and on Government furnished vessels indicate that the specifications for vessel performance should be materially upgraded. Changes in MIL-T-25363B to reduce costs and increase reliability are recommended. (Author)

AD-600 234 Div. 1, 12
OTS Price $4.00

Norair Div., Northrop Corp., Hawthorne, Calif.
INVESTIGATION OF A METHOD FOR THE PREDICTION OF VIBRATORY RESPONSE AND STRESS IN TYPICAL FLIGHT VEHICLE STRUCTURE. SUPPLEMENT I - DYNAMIC MODELING OF COMPLEX STRUCTURES.
Rept. for Dec 62-Aug 63
by W. H. Roberts and P. E. Finwall. Apr 64, 272p
NOR63 139
Contract AF33 657 10075, Proj. 1370, Task 137005
ASD TDR62 801 S1

Unclassified report

Report on Dynamic Problems in Flight Vehicles.

Descriptors: (*Airframes, Models (Simulations), (*Fuselages, Vibration), (*Airplane models, Vibration), (*Guided missiles, Model tests), Rockets, Sandwich panels, Honeycomb cores, Stresses, Acoustic properties.

The dynamically similar structural model of the preceding contract (See AD-416 784) was redesigned and reworked to improve the simulation. The sandwich structure simulation, the backing board simulation, the intake ducting simulation were improved. Some previously discovered errors in simulation were corrected. The reworked model was then Vibroacoustically tested. The results of this testing were compared to the results of the actual fuselage portion testing of the previous contract. The model was modified to obtain a dynamically similar structural model of the complete XSM-62 Snark missile. The Acoustic (noise) Test Program that was performed on the XSM-62 Snark missile during the design and development of the Snark missile program was duplicated for the model. The model test data was compared to the results of the missile test program. This was done to show the feasibility of such a dynamic modeling method for design of future missile and space vehicle systems. (Author)

AD-600 326 Div. 1
OTS Price $2.00

Applied Psychology Corp., Arlington, Va.
THE ROLE OF OPTICAL DEVICES IN MID-AIR COLLISION PREVENTION.
Final rept. no. 5
Nov 63, 79p
Contract FAA BRD127, Proj. 110 512R
FAA RD64 2

Unclassified report

Descriptors: (*Optical equipment, Aviation safety), (*Aviation safety, Optical equipment), (*Aviation accidents, Aviation safety), Binoculars, Telescopes, Eyeglasses, Periscopes, Mirrors, Television guidance, Space perception, Visual perception, Vision, Collimators.

The report summarizes that portion of a research program on visual mid-air collision avoidance techniques which deals with the feasibility and efficacy of various optical aids. Literature relevant to promising optical aids is reviewed, including that on: sunglasses, visors, goggles, telescopes, binoculars, periscopes, sighting levels, collimated reticles, rear-view mirrors, and closed-circuit television. No one optical aid can provide adequate assistance over the entire range of visual conditions found in flight. Sunglasses provide a number of advantages including the reduction of glare and the immediate and cumulative effects of exposure to high brightness levels. Telescopes and binoculars can assist in making inferences about detected aircraft, but will not materially assist in searching. Rear vision may be increased by mirrors, but mirror vibrations and vibrations acting upon the pilot degrade visual performance. (Author)

AD-600 359 Div. 1
OTS Price $0.75

Federal Aviation Agency, Washington, D. C.
A STUDY OF THE BIRD-IMPACT RESISTANCE OF WIND-SHIELDS FOR HIGH PERFORMANCE TRANSPORT AIRCRAFT.
Technical rept.
by John Sommers, Jr. Mar 64, 28p
Proj. 314 3X
FAA ADS8

Unclassified report

Descriptors: (*Windshields, Transport planes), (*Laminates, Toughness), Impact shock, Birds, Toughness, Laminated glass, Laminated plastics, Acrylic resins, Vinyl plastics, Aluminum alloys, Corrosion-resistant alloys, Steel, Sandwich construction, Aircraft canopies.

and (4) describe needed methods for presentation of operational information. The added sections pinpoint not only that information needed for strictly operational use but its relative worth and most easily assimilable form. The report finds that while much needs to be done in observing and processing meteorological information, and in re-aligning operational product distribution, the primary deficiency in operational aviation weather service today - and for the foreseeable future - lies in the area of presentation of weather information to users in a form and with the content that they can apply directly to their operational decisions. (Author)

AD-600 134 Div. 1, 2
OTS Price $3.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
HANDBOOK ON THE HIGH-ALTITUDE VERTICAL-HORIZONTAL SOUNDING OF THE ATMOSPHERE IN THE IL-28 AIRCRAFT.
by V. A. Devyateva. 20 Mar 64, 194p
FTD TT63 619 TT 64 11651

Unclassified report

Unedited rough draft trans. of mono. Rukovodstvo po Vysotnomu Vertikal'no-Gorizontal'nomu Zondirovaniyu Atmosfery na Samolete IL-28, Moscow, 1962 (149p).

Descriptors: (*Handbooks, Atmospheric sounding), (*Atmospheric sounding, Handbooks), (*Aircraft, Meteorological instruments), Atmosphere, Meteorology, Scientific research.

The Handbook on the High-altitude Vertical and Horizontal Sounding of the Atmosphere in the IL-28 Aircraft serves the purpose of setting up a uniform order and of establishing uniform methods for all visual and instrumental observations and the operations connected with them, which are to be carried out by workers at the high-altitude aircraft sounding stations of the Hydrometeorological Service and by the workers at the LERM's of Civil Air Fleet airports. All changes and improvements in flight conditions, in methods of observation, in the operation of the recording tape and in the writing of the yearbook are generalize and systematize in the handbook. The book gives a detailed description of the K4-51 recorder, of its checking in the LERM laboratory and of its servicing instructions. A new method for determining the true ambient-air temperature is given. The method for processing the acceleration curve is explained in more detail than previously. A description of new devices for operating the recording tape, and a description of the high-altitude and oxygen equipment in the flight aerologist's cabin are given. The handbook is therefore distinguished by great material completeness. It comprises four sections. (Author)

AD-600 137 Div. 1, 8
OTS Price $16.50

Airborne Instruments Lab., Inc., Deer Park, N. Y.
STUDY OF INTEGRITY, RELIABILITY, AND ACCURACY OF AUTOMATIC HEIGHT REPORTING SYSTEM VIA ATC RADAR BEACON SYSTEM.
Final rept. phases I and II.
by Allan Ashley and Lanier G. Cole. Sep 63, 253p
AIL 8893-7
Contract FAA BRD329

Unclassified report

Descriptors: (*Height finding, Altimeters), (*Radar beacons, Height finding), (*Altimeters, Effectiveness), (*Flight instruments, Safety), Automatic, Operation, Errors, Air traffic control systems.

This study is divided into two phases. Phase I is concerned with: (1) code degradation resulting from synchronous and random interference, and (2) code-detection criteria. Analytical models include random and operationally controlled distributions of aircraft with emphasis on high-density areas. It is concluded that height data derived from this system will afford good integrity. Belief in the high code integrity of the automatic-altitude reporting system leads one to inquire about the accuracy of the system or whether the task can be performed more efficiently by another type of radar equipment. This is the essential subject matter of Phase II of the study. The accuracy of various altimetry systems is statistically assessed in terms of maintaining vertical separation. ICAO analyses of altimeters are used as a basis of evaluation with modifications included for the parameters of the automatic reporting system. It is concluded that the statistical accuracy of altitude data derived from the automatic reporting system, with regard to the effect on vertical separation, is not significantly different from that of comparable existing altimetry. In fact, an extra margin of safety should be attained by providing the controller with a means to monitor the flight technical error. Also, data rate and capacity of the ATCRBS is equal to or greater than that of other systems that have been considered. (Author)

AD-600 169 Div. 1
OTS Price $0.75

Systems Engineering Group, Research and Technology Div., Wright-Patterson AFB, Ohio.
BREAKING-STRENGTH AND ENDURANCE TESTS OF ALUMINUM TURNBUCKLES FOR AIRCRAFT.
Technical documentary rept. July-Nov 63.
by Perry L. Smith. Mar 64, 24p
SEG TDR64 2

Unclassified report

Descriptors: (*Positioning devices (Machinery), Aircraft control cables), (*Aluminum alloys, Positioning devices (Machinery), Tensile properties, Failure (Mechanics), Fatigue (Mechanics), Brass, Temperature, Buffeting, Vibration, Sodium compounds, Chlorides, Bombers, Transport planes.

Breaking-strength and endurance tests were run to make possible a partial evaluation of the strength of turnbuckle bodies fabricated from 2024T6 aluminum alloy. Aircraft control cable turnbuckles and fittings were exposed to extremes of temperature, salt water spray, buffeting, and low-amplitude high-frequency vibration. Failures in the aluminum bodies occurred at the transverse hole drilled through the middle of the body. When the aluminum body is modified so that the opening area is 0.057 inch, failures at the transverse hole can be eliminated. Tests of brass and aluminum bodies showed that the ratio of average tensile strength to weight of aluminum bodies was 61 percent better than for the brass bodies. When aluminum barrels were used instead of brass barrels, a saving of approximately 7 pounds could be realized for bodies used with a cargo or bomber type aircraft. (Author)

AD-600 170 Div. 1, 14
OTS Price $2.00

Douglas Aircraft Co., Inc., Long Beach, Calif.
SONIC FATIGUE DAMPING MATERIAL.
Final rept.
by P. R. McGowan and J. M. Snider. Sep 63, 79p LB31451
Contract NOw62 1071c

Unclassified report

Descriptors: (*Sonic fatigue, Inhibition), (*Vibration, Damping), (*Adhesives, Stresses), Adhesion, Glass, Aluminum, Pigments, Sulfides, Epoxy plastics, Nylon, Strain (Mechanics), Creep, Composite materials, Tests, Airplane panels, Simulation, Polymers.

This report contains the results of a program concerned with the design, construction, and flight testing of a high-performance statis electricity discharging system for helicopters. Flight test data showed that the discharging system kept the electrostatic energy of a CH-37 helicopter below 1 millijoule for natural charging currents of up to 50 microamperes. This is in accordance with the established design specifications. Data were also obtained on the radio interference characteristics of the system and on the performance of corona points located in the engine exhaust stream. (Author)

AD-600 470 Div. 1, 9
OTS Price $4.00

Technology, Inc., Dayton, Ohio.
STRUCTURAL FLIGHT LOADS DATA FROM C-130 AIRCRAFT.
by Larry E. Clay and Alan P. Berens. Apr 64, 265p
Contract AF33 657 9845
ASD TDR64 78

Unclassified report

Descriptors: (*Transport planes, Aerodynamic loading), (*Aerodynamic loading, Transport planes), Gust loads, Flight testing, Data, Tables, Model tests.

This report discusses a C-130 flight loads program conducted to obtain, process, and analyze data of three in-flight variables--normal acceleration at the aircraft's center of gravity, altitude, and airspeed. From four C-130 models--C-130A, C-130B, JC-130, and HC-130G--8155 hours of usable data were acquired. The aircraft operated from six bases located in the Pacific, the Continental United States, and Europe. Presented in this report are a history of the data recording and discussions of the techniques for data recording, processing, and analyzing. None of the models yielded any data exceeding the design limit load factors. The various air base locations appreciably affected the gust spectra. In the lower load factor range of the C-130A and C-130B data, the gust spectrum was more severe than the maneuver spectrum. (Author)

AD-600 482 Div. 1
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EXPERIMENTAL INVESTIGATION OF A SELF-ADJUSTING SYSTEM WHICH CONTROLS THE INTERMEDIATE QUALITY CRITERION.
by V. M. Kuntsevich, and L. I. Chugunnaya. 4 May 64, 15p
FTD TT64 41 TT 64-11727

Unclassified report

Unedited rough draft trans. of Avtomatyka (USSR) 1963 (v. 8) no. 2, p. 3-12.

Descriptors: (*Adaptive control systems, Feasibility studies), Control systems, Automatic, Damping, Integrators, Circuits, Oscillographs, Analysis, USSR.

From the view point of obtaining the possible rate of self adjusting the system the known quality criteria should be divided into two groups. The first group of such criteria, which utilize all kinds of integral evaluations and mean quadratic deviations, allows to evaluate the operational quality of the systems only upon applying the already established conditions, or, in other words, these criteria do by nature require a constant observation of the behavior of the system. It is natural that self adjustment of a system, which utilize such a criteria for evaluating the quality of the system, cannot be sufficiently fast acting. The other group of quality criteria, which utilizes phenomena connected with the disposition of poles and zeros of the systems (degree of stability and degree of oscillation), allows to form a more rapidly acting self adjusting system, since the numerical values of the applied quality evaluations may be, at least in principle, obtained directly during the transient process. Thanks to a number of causes self-adjusting systems acquired considerable expansion. The purpose of these systems is to maintain stability of the degree of oscillation (respective damping).

AD-600 500 Div. 1
OTS Price $1.50

Fulton (Robert E.) Jr., Newton, Conn.
FULTON AIR-TO-GROUND PICKUP SYSTEM FOR CARIBOU AIRCRAFT.
Feb 64, 52p
Contract DA44 177TC804, Task 1D141812XXX02
TRECOM TR64 17

Unclassified report

Descriptors: (*Aerial pickup systems, Flight testing), (*Short take-off planes, Aerial pickup systems), Aircraft equipment, Air-sea rescues, Balloons.

The report contains observations, recommendations, and conclusions regarding the joint engineer-user tests of the Fulton Air-To-Ground Pickup System. Also included are the historical background of the system, the principle of operation, and a description of the equipment employed. The test series was satisfactorily completed and justifies concluding the recovery system is safe, reliable, and ready for use with the Caribou aircraft to recover personnel and equipment from land and from water. (Author)

AD-600 513 Div. 1, 9
OTS Price $5.00

Frost Engineering Development Corp., Denver , Colo.
PRELIMNARY STUDIES OF THE APPLICATION OF PERIPHERAL FANS TO GROUND EFFECT MACHINES.
Final rept.
by William E. Sickles. Apr 14, 304p Frost142 18
Contract DA44 177AMC5T, Task 1D021701A04814
TRECOM TR64-10

Unclassified report

Descriptors: (*Ground effect machines, Lift), (*Gas pumps, Rotary pump), (*Fans, Aerodynamic characteristics), Design, Performance (Engineering), Gas flow.

This report describes the concept, development of applicable theory, and experiments performed to date with the Frost fan. Essentially a rotary vane air pump, the Frost fan lends itself to installation around the periphery of ground effect machines for generation of the lifting cushion pressure. Structural and space utilization advantages are inherent in this concept, and enhance the potentially high overall efficiency gained through almost complete elimination of duct losses. Test data and theory are also presented on the application of crossflow blowers to the peripheral fan concept. Similar information on energy recovery through recirculation of lift cushion air is included, with indication of shortcomings in practical applications of recirculation. (Author)

AD-600 518 Div. 1, 30
OTS Price $2.50

Air Force Flight Dynamics Lab., Research and Technology Div., Wright-Patterson AFB, Ohio.
DIGITAL COMPUTER PROGRAM FOR THE ANALYSIS OF AEROSPACE STRUCTURES BY THE MATRIX DISPLACEMENT METHOD.
Technical documentary rept., 10 Jan 62-15 July 63.
by J.S. Przemieniecki and Laszlo Berke. Apr 64, 115p
Proj. 1467, Task 146705
FDL TDR64 18

Unclassified report

Descriptors: (*Programming (Computers), Matrix algebra), (*Structures, Mathematical analysis), (*Matrix algebra, Programming (Computers), Aerospace craft, Structural parts, Loading (Mechanics), Stresses, Distribution, Digital computers.

This report presents a detailed development of the Matrix Displacement Method and describes an available computer program which can be used for the stress and deflection analysis of arbitrary structures idealized into an assembly of axial load members (bars), triangular panels, rectangular panels

Division 1 - AIRCRAFT AND FLIGHT EQUIPMENT

Significant structural design information on bird-impact resistant windshields was extracted from all available reports of test programs conducted on transport category aircraft since 1956. This information was compiled and analyzed for use as a supplement to test and design data contained in CAA Technical Development Reports Nos. 74 and 105. New state-of-the-art developments were emphasized and the validity of previously developed design principles was confirmed. The study revealed that the glass-vinyl-glass type windshield continues to be the most utilized design for bird-impact resistance. New developments include the substitution of corrosion-resistant steel for aluminum in the edge design for glass-vinyl panels, the use of an acrylic-vinyl-acrylic laminate in one new aircraft forward windshield, and the incorporation of an acrylic-castable interlayer-acrylic laminate in one skylight window design. (Author)

AD-600 360 Div. 1, 2, 4
OTS Price $1.50

IIT Research Inst., Chicago, Ill.
OZONE MEASUREMENT SURVEY IN COMMERCIAL JET AIRCRAFT.
Technical rept.
by Robert I. Brabets. Nov. 63, 58p
Contract ARDS608, Proj. 347 22Hl
FAA ADS5

Unclassified report

Descriptors: (*Ozone, Measurement), (*Ozone, Commercial planes), (*Ozone, Jet planes), Aircraft cabins, Cockpits, Tropopause, Mapping, Meteorology, Transport planes.

A survey was made to (l) measure ozone concentrations in CAR 4b jet aircraft cabins and cockpits on flights above 25,000 ft to obtain a 12-month evaluation with emphasis on seasonal and meteorological correlation and (2) locate and chart ozone-enriched air masses to obtain further correlations and to find any abnormal conditions that result in high ozone concentration. The data obtained by monitoring jets showed: (1) External ozone enters via the pressurization system. (2) Ozone concentration varies with altitude, latitude, and season. (3) Pressurization systems of various aircraft do not differ in ozone-decomposing efficiency. (4) Internal ozone concentration is negligible on flights made below the tropopause. (Author)

AD-600 387 Div. 1, 14
OTS Price $2.50

Federal Aviation Agency, Washington, D. C.
FLAMMABILITY AND SMOKE CHARACTERISTICS OF AIRCRAFT INTERIOR MATERIALS.
Final technical rept.
by John F. Marcy, E. B. Nicholas, and J. E. Demaree.
Jan 64, 112p
Proj. 311 3X1
FAA ADS3

Unclassified report

Descriptors: (*Fire-resistant textiles, Aircraft) (*Plastics, Test methods) (*Metals, Thickness) (*Glass textiles, Aircraft fires) (*Laminates, Flammability) Aviation industry, Safety, Airplane panels, Weight, Chemical analysis, Smokes, Toxicity, Degradation, Wear resistance, Cleaning, Standards, Specifications.

Flammability and smoke characteristics of interior materials were determined from a selection of 109 materials representative of present usage in the aviation industry. A comparison was made of the flame-resistant characteristics exhibited by the different materials on the basis of: (1) test method, (2) thickness, weight, composition and backing, (3) fire-retardant treatment, and (4) degradation from use and cleaning. By employing test methods defined in FAA Flight Standards Service Release 453 and Federal Specification CCC-T-191b, burning characteristics were obtained in terms of burn rate, burn length, and self-extinguishing time. A Flame-Spread Index and smoke factor also were obtained by making use of the Radiant Panel Test Apparatus. (Author)

AD-600 409 Div. 1, 11, 26
OTS Price $0.50

Merz-Chambers Corp., Indianapolis, Indiana.
FLIGHT PROGRESS STRIP LOADER TYPE II.
Final rept.
Dec 63, 18p
Contract ARDS448, Proj. 103 500 00D,
FAA RD64 22

Unclassified report

Descriptors: (*Flight instruments, Design), Motion, Acceleration, Deceleration, Torque, Clutches, Conveyors, Flight control systems, Rotation, Rupture, Springs, Drives.

The purpose of this project was to develop a device capable of; automatically separating perforated fan folds of flight progress strips type FAA-566-XI into individual strips, loading the individual strips into nylon holders type FAA-B4496-6; delivering the loaded holders to an operator at a rate of sixty per minute. The original design approach was to separate the strips and draw them longitudinally into the holder. This necessitated a strip travel of over ten inches. The original design approach was abandoned in favor of an approach which allowed the strips to be laterally inserted into the holder. This revised approach provides a strip travel of only one inch and maximum mechanical linkage motions of about three inches. Although the Flight Strip Loader Type II is functionally acceptable, improved operation and component accessibility may be obtained by revising certain sections of the machine. (Author)

AD-600 433 Div. 1, 2
OTS Price $0.50

Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
INVESTIGATION OF THE EFFECT OF LAPSE RATE ON BALLOON ASCENT RATE.
Final technical rept.
by Ralph D. Reynolds. May 64, 17p
ERDA 140

Unclassified report

Descriptors: (*Lapse rate, Baloons), (*Baloons, Ascent trajectories), Meteorology, Thermodynamics, Aerodynamic characteristics, Measurement.

The relationship between temperature lapse rate and balloon ascent rate was investigated for large (2000-pound gross load) polyethylene skyhook balloons and the relatively small neoprene rawinsonde balloon. In general, the results indicate that the lapse rate is a minor factor in determining balloon ascent rate and should be considered only after other pertinent factors are better understood. (Author)

AD-600 451 Div. 1, 8
OTS Price $8.60

Dynasciences Corp., Fort Washington, Pa.
A HIGH-PERFORMANCE ELECTROSTATIC DISCHARGER FOR HELICOPTERS.
Final rept.
Dec 63, 98p DCR113
Contract DA44 177AMC 3T
TRECOM TR63 43

Unclassified report

Descriptors: (*Helicopters, Flight testing), (*Electric discharges, Static electricity), Design, Construction, Radio interference, Electronic equipment.

Descriptors: (*Flight control systems, Optimization), (*Optimization, Flight control systems), Aircraft equipment, Linear systems, Aerodynamic characteristics, Mathematical models, Differential equations, Programming (Computers), Performance (Engineering).

This report describes a study of the application of optimal control techniques based on a generalized quadratic performance index to the primary control system design of an X-15-type aircraft and a large flexible booster. The following aspects of the application of optimal theory were studied: (1) The use of mathematical models to obtain desirable transient characteristics; (2) realizability of feedback configurations; (3) a comparison between optimal and conventional design techniques; (4) relationships between the weighting factor of the performance index and the dynamics of the optimal system; and (5) the use of an IBM 7090 program to obtain optimal solutions of the control problems. (Author)

AD-600 717 Div. 1
OTS Price $3.60

Wyle Labs., Inc., El Segundo, Calif.
STRUCTURAL INTEGRITY, ACCELERATED CORROSION AND FLOW CAPACITY TESTS OF PARKER AIRCRAFT COMPANY VALVE, CHECK, ONE-INCH, AIRBORNE, FUEL PARKER PART NUMBER 2630014. GD/A PART NUMBER 27-02402-5.
Test rept.
Jan 64, 32p Wyle Test14985
Contract AF04 694 287,
BSD TDR64 5

Unclassified report

Descriptors: (*Check valves, Tests) Tests, Structural properties, Corrosion, Fluid flow, Pressure, Fuels, Airborne.

Two units were submitted for testing. The test program consisted of diameter measurements, accelerated corrosion, flow capacity and burst pressure tests. A 30-day accelerated corrosion test caused severe corrosion of the body base metal; but, there was no evidence of stress corrosion cracking. The pressure drop was 5.2 psi (allowable is 9 psi) at a water flow rate of 70 gpm. The burst pressure of a unit free of corrosion was 5100 psig. A unit previously subjected to a 30-day accelerated corrosion test demonstrated a burst pressure of 3650 psig. Minimum required burst pressure is 2400 psig. A detailed description of all tests and results, including a list of equipment employed in the performance of the test program, is presented in this report. (Author)

AD-600 730 Div. 1, 25, 30
OTS Price $2.50

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
AN INVESTIGATION OF A LASER/INTERFEROMETER ATTITUDE MONITORING DEVICE.
by Henry A. Olender. Dec 62, 111p
AFIT GE EE62 17

Unclassified report

Descriptors: (*Lasers, Interferometers), (*Interferometers, Lasers), (*Monitors, Attitude control systems), Inertial guidance, Flight instruments, Stabilization systems, Optical equipment, Design, Tests, Analysis.

A laser beam referenced, Fabry-Perot type, angle sensing interferometer for precise inertial platform attitude monitoring was designed, analyzed and tested. Analysis indicated an angular sensitivity of 0.1758 fringes per arc second with an estimated accuracy of ± 0.285 arc seconds. The non-optimized device tested was satisfactory with respect to full field interference quality and signal characteristics. Angular sensitivity data showed good agreement with theory. Calibration data deviations from theory were greater than the estimated experimental accuracy. The probable cause of the poor agreement was the phase shift effect observed but not investigated. Several possible causes of this effect were discussed. (Author)

AD-600 741 Div. 1, 18
OTS Price $0.75

Army Natick Labs., Mass.
MINIMUM AIRDROP ALTTUDES USING STANDARD PARACHUTE EQUIPMENT.
by William R. Lewis. Apr 64, 21p
ANL ADED64 2

Unclassified report

Descriptors: (*Parachute descents, Low altitude), (*Air-drop operations), Parachutes, Air-drop operations, Transport planes.

Requirements of the Air Force computed air release point system (CARP), parachute ballistic data input to the CARP solution, airdrop capability of troop carrier aircraft, present and recommended airdrop altitudes, performance capability of existing standard parachute equipment and changes to exsting standard parachute equipment having potential for improving its capability for use at lower airdrop altitudes, were reviewed. Minimum airdrop altitudes considered feasible using existing unmodified standard parachute equipment were determined. (Author)

AD-600 771 Div. 1, 9, 15
OTS Price $4.00

General Dynamics/Astronautics, San Diego, Calif.
ANALYSIS OF TWO NONLINEAR FLIGHT CONTROL SYSTEMS. PART I. LIAPOUNOV-LURJE APPROACH TO A SIMPLIFIED PITCH RATE AUTOPILOT. PART II. ANALYSIS OF A HIGH-GAIN ADAPTIVE PITCH RATE AUTOPILOT.
by T. R. Alex and C. R. Heermann. Apr 64, 300p
Contract AF33 616 8243, Proj. 8225, Task 822501
ASD TDR62 369

Unclassified report

Descriptors: (*Flight control systems, Nonlinear systems), (*Automatic pilots, Performance (Engineering)), (*Adaptive control systems, Pitch (Motion)), Functions, Differential equations, Airframes, Dynamics, Stability, Numerical analysis.

This report covers the analytical treatment of two non-linear control configurations of immediate interest to the flight control designer. In Part I stability borders and their properties are derived by the Liapounov-Lurje approach for third and fifth order versions of a simplified Pitch Rate Autopilot. For each system version pertinent Liapounov functions are set up and processed, then Lurje's stability equations separated and the latter processed as far as reasonable to yield sufficient stability conditions defined by discriminants in closed algebraic form. The treatment of each system version is paralleled by analyses based on the method of harmonic balance. In Part II simple mathematical expressions for estimating the oscillation or limit cycle parameters of a High Gain Adaptive Pitch Rate Autopilot involving an 8-th order system with 2 non-linearities are derived. For the closer study of the system response to gain perturbations an equivalent third order model operating at the stability border is derived and investigated for the possibility of parametric excitations. Ultimately, by introducing a sampling concept, a method for approximate computation of the system response to gain changes is derived. Incorporated into the report are 4 Appendices, dealing with the mathematical background of the methods employed in the main body of the report. (Author)

AD-600 775 Div. 1, 7, 19, 25
OTS Price $2.25

National Aviation Facilities Experimental Center, Atlantic City, N. J.
EVALUATION OF TAXIWAY CENTERLINE LIGHTING
Final rept.
by Robert F. Gates. Mar 64, 81p
Proj. 421 013 OOV
FAA RD64 46

Unclassified report

with linearly varying edge displacements, and rectangular panels with an assumed (Turner) stress distribution. Only the translational degrees of freedom are considered in this program. Five different loading conditions may be analyzed simultaneously, and for each condition a separate temperature distribution may be specified. A description of the digital analysis, instructions for the use of the available program, and an illustrative analysis problem are presented. (Author)

AD-600 567 Div. 1, 9
OTS Price $2.00

Hydronautics, Inc., Laurel Md.
THE STATIC PERFORMANCE OF AN ASPECT RATIO 2/3 GROUND EFFECT MACHINE.
by Vincent R. Pfisterer. Jan 64, 79p
Hydro TROLL 5
Contract Nonr3189 00, Proj. SR009 01 01
Unclassified report

Descriptors: (*Ground effect machines, Captive tests), Ground effect, Model tests, Stability, Lift, Pitch (Motion), Pressure, Jets, Nozzles.

The results of an experimental investigation of the static performance of an aspect ratio 2/3 peripheral jet ground effect machine model are presented and compared with available theory. The investigation included measurements of lift, pitching moment, base pressure, and plenum chamber pressure for the model with various nozzle thicknesses and base recess depths and for a variety of model heights and pitch angles. Results reported include the lifting performance and the static pitch stability of the model. Observations of the flow beneath the model were also made. (Author)

AD-600 577 Div. 1, 27
OTS Price $3.00

Therm Advanced Research, Inc., Ithaca, N. Y.
A DETAILED NUMERICAL EVALUATION OF SHROUD PERFORMANCE FOR FINITE-BLADED DUCTED PROPELLERS.
by A. L. Kaskel, D. E. Ordway, G. R. Hough, and A. Ritter.
Dec 63, 176p TAR TR639
Contract Nonr2859 00
Unclassified report

Descriptors: (*Shrouded propellers, Performance (Engineering)), (*Shroud rings, Performance (Engineering)), Propellers (Aerial), Loading (Mechanics), Aerodynamic characteristics, Numerical analysis.

Based on the three-dimensional theory developed at Therm Advanced Research, a simple procedure for calculating the detailed aerodynamic loading on the shroud of a finite-bladed ducted propeller in foward flight is presented. This procedure was designed for the evaluation of the several thousand configurations exactly represented by the tabulated values of the pertinent parameters, or reasonably approximated by them. In addition, configurations whose parameters fall somewhat in between or outside these values can be evaluated by suitable interpolation or extrapolation. The data were selected through liaison with propeller and aircraft manufacturers to encompass the current state of the art for ducted propeller design. As a result, it is possible to carry out a number of calculations by hand quite readily which could not be done heretofore, for example, the examination of the effect of the propeller advance ratio. (Author)

AD-600 625 Div. 1, 9
OTS Price $4.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
DETERMINATION OF AERODYNAMIC HEATING OF HYPERSONIC GLIDER WINGS.
Technical Information series
by Martin Kaplan. 1961, 50p R61SD12
Contract AF33 600 41827,
Unclassified report

Descriptors: (*Aerodynamic heating, Wings), (*Wings, Gliders), Hypersonic flow, Blunt bodies, Flat plate models, Heat transfer, Mathematical prediction.

A simplified, approximate engineering method is developed, in order to predict the surface heat transfer on a flat plate with pressure gradient, caused by nose bluntness and viscous interaction effects. This method also attempts to allow for the effect of sweep and angle of attack on the surface heat transfer. Good agreement is obtained when correlating the new method with a limited amount of experimental data except, at conditions where the pressure gradient approaches zero. These experimental studies are for large Mach number, low density, real gas flow. (Author)

AD-600 672 Div. 1
OTS Price $3.00

Giannini Controls Corp., Malvern, Pa.
FLEXIBLE FLIGHT VEHICLE TRANSFER FUNCTION FACTORS FOR USE IN AUTOPILOT PRELIMINARY DESIGN.
by A. G. Fonda and F. J. Trueh. Apr 64, 167p
Contract AF33 657 8456, Proj. 8219, Task 821901
RTD TDR63 4218
Unclassified report

Descriptors: (*Flexible structures, Aircraft), (*Functions, Automatic pilots), (*Flight control systems, Mathematical analysis), (*Automatic pilots, Design) Airframes, Structural properties, Aerodynamic characteristics, Graphics, Theory.

This report presents a series of charts of forward-loop transfer function poles and zeroes for a general flight vehicle having both rigid and elastic longitudinal degrees of freedom. These charts allow an assessment to be made, early in the design of an autopilot-airframe system, of the influence of flexibility and modal interaction upon the system's dynamic response. In addition to the numerical approach made possible by this report, the charts and accompanying theory provide a technical foundation for understanding the cause-and-effect relationship between the design and the dynamic behavior of a flexible flight vehicle. A method of interpolation between charts also results from the theory presented and permits application of the design chart data to a multitude of flexible flight vehicle configurations. (Author)

AD-600 677 Div. 1
OTS Price $0.50

Naval Air Test Center, Patuxent River, Md.
UNIVERSAL AIR REFUELING DROGUE; FIT CHECK AND FLIGHT TEST OF.
Final rept.
by D. C. Owings and R. O. Lutz. 21 May 64, 7p
Contract NOw62 0938 Task RA1200001
NATC ST31 53R64
Unclassified report

Descriptors: (*Towed bodies, Tests), (*Refueling in flight, Towed bodies), Flight testing.

AD-600 694 Div. 1
OTS Price $2.75

Cornell Aeronautical Lab., Inc. Buffalo, N. Y.
DESIGN OF LINEAR FLIGHT CONTROL SYSTEMS USING OPTIMAL CONTROL THEORY.
by E. G. Rynaski, P. A. Reynolds, and W. H. Shed.
Apr 64, 138p CAL IH1648F1
Contract AF33 657 7498, Proj. 8225, Task 822501
ASD TDR63 376
Unclassified report

AD-600 829 Div. 1, 19
OTS Price $2.50

National Avition Facilities Experimental Center, Atlantic City, N. J.
EVALUATION OF THE BLEU AUTOMATIC LANDING SYSTEM.
Final rept.
by J. Ridas Vice and James C. Muir. Dec 63, 104p
Proj. 114 004 01V

Unclassified report

Descriptors: (*All-weather aviation, Airplane landings), (*Automatic pilots, Airplane landings), Transport planes, Flight testing, Air traffic control systems, Electronic equipment, Airborne, Flight paths.

The report contains: a description of the operational procedures used with the DC-7 during approaches for automatic landings; a general description of the additional airborne electronic equipment required for automatic landings; histograms, graphs, and statistical comparisons that describe the performance of the system at touchdown and over the final portion of the approach and landing path; data obtained from pilots and other observers during automatic landings made on instrument landing system installation presenting various types of approach terrain. Based on the results obtained during the evaluation, it was concluded that: the single channel automatic landing system allowed the DC-7 to make consistent automatic landings of good quality; the results obtained using a directional localizer were comparable to those obtained using magnetic leader cables (indicating no need to introduce magnetic leader cables for lateral control); and, the present DC-7 flight instruments were not adequate for monitoring of automatic landings during extremely poor visibility conditions. (Author)

AD-600 861 Div. 1
OTS Price $1.50

Minnesota Univ., Minneapolis.
AERODYNAMIC CHARACTERISTICS OF THE PARAFOIL GLIDER AND OTHER GLIDING PARACHUTES.
by H. G. Heinrich, Thomas Nietz, and Harvey Lippa.
Apr 64, 58p
Contract AF33 616 8310, Proj. 6065, Task 606503
RTD TDR63 4022

Unclassified report

Descriptors: (*Parachutes, Aerodynamic characteristics), Stability, Angle of attack, Lift, Drag, Model tests, Aerodynamic characteristics, Design.

A newly conceived gliding parachute, called the parafoil glider, and several existing glide parachutes have been examined with regard to their general stability, resulting stable angle of attack, and lift to drag ratio. The parafoil glider assumed stable angles of attack up to 50 degrees against the vertical which represents a lift to drag ratio of approximately 1.2. The investigated existing parachutes had lift to drag ratios of less than unity. The tangential force coefficient of the parafoil glider amounts to approximately 1.5 at the position of the stable angle of attack.

Descriptors: (*Terminal flight facilities, Lighting equipment), (*Lighting equipment, Runways), (*Taxiing, Navigational lights), (*Navigational lights, Runways), Optics, Visibility, Environmental tests, Simulation, Configuration, Design, Analysis.

The report reviews the taxiing problem during low visibility conditions. In accomplishing the project, comparisons were made among the standard blue taxiway edge lighting, taxiway edge reflective markers, and taxiway centerline lighting. Adequacy of new fixtures, 180 cycle regulators and a control system for taxiway centerline lighting was also evaluated. A specially prepared Mylar film was used in simulating taxiway centerline light visibilities (TCLV) of 1500, 600 and 200 feet on straight and curved taxiways of differing radii. Photometric and environmental tests were conducted over a period of approximately a year and a half on four types of fixtures. It was concluded that taxiway centerline lighting was a significant improvement over conventional edge lighting and that aircraft could accurately taxi in visibilities as low as 200 feet over a taxiway centerline lighting system. None of the fixtures withstood the environment encountered. Taxiway edge reflectors showed promise but further development was recommended. No problems were encountered with the 180-cycle regulators and control system. It was recommended that a Selection Memorandum for taxiway centerline lighting be prepared by applying the results of this evaluation to fixture configuration and spacing. Green was recommended as the color for taxiway centerline lighting to differentiate between it and the white runway centerline lighting. (Author)

AD-600 783 Div. 1, 2, 12, 25
OTS Price $1.75

Ewen Knight Corp., Needham , Mass.
OXYGEN HORIZON SEEKER, THEORETICAL ANALYSIS.
Scientific rept. no. 1
14 Feb 64, 65p
Contract AF19 628 3239, Proj. 4427, Task 442702
AFCRL 64 141

Unclassified report

Descriptors: (*Vertical indicators, Radiation measurement systems), (*Oxygen, Radiation measurement systems), (*Optical instruments, Vertical indicators), Spacecraft, Flight instruments, Optics, Measurement, Theory, Analysis.

This report is a theoretical analysis dealing with the physics of using the oxygen horizon for vertical sensing. The data resulting from this analysis deals with the profile of the oxygen horizon as seen by an orbiting vehicle. This report contains brightness temperatures and extensions of the original work accomplished by Lilley and Meeks. Limb brightening and angular slope of the oxygen mantle are described in detail, and the effects of varying limb temperatures and its result on vertical sensing accuracies are included in this report. The system parameters which would be required to perform vertical sensing experiments and have resulted from this theoretical analysis are also included in this report. Results and conclusions are presented to substantiate the feasibility of this experiment.

AD-600 818 Div. 1
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
KAI-19,
by M. Simonov. 23 Apr 64, 12p
FTD TT64 341, TT 64 11673

Unclassified report

Unedited rough draft trans. of Kryl'ya Rodiny (USSR) 1963, v. 14, no. 12, p. 2 -24.

Descriptors: (*Gliders, Aerodynamic characteristics), (*Aircraft, Gliders), Aeronautics, Engineering, Airframes, Aerodynamic configurations, Weight, Structural properties, Instrumentation, USSR.

The KAI-19 has the following specifications: maximum aerodynamic efficiency 45, minimum rate of descent 0.52 m/sec, at the speed of 250 km/hr 1.67 m/sec, minimum speed without flaps 59 km/hr, maximum speed 250 km/hr, economic speed 85 km/hr, economic speed in spiral with 45 degrees banking 78 km/hr, radius of spiral with banking of 45 degrees 50 m, minimum rate of descent in spiral with banking of 45 degrees 1.0 m/sec, minimum radius of spiral without flaps 40 m, and maximum aerodynamic quality with extended air brakes 13.6.

AD-600 822 Div. 1, 8
OTS Price $2.25

Hazeltine Research Corp., Little Neck, N. Y.
SMALL LIGHT-WEIGHT ALTITUDE TRANSMISSION EQUIPMENT
Final engineering rept.
15 Apr 64, 95p Hazel 10136
Contract ARDS558, Proj. 108 28 1D

Unclassified report

Descriptors: (*Air traffic control systems, Transponders), (*Transponders, Height finding), Airport radar systems, Aircraft equipment, Transmitter-recievers, Coding, Altimeters, Aircraft anteannas, Modulators.

The report describes the design and development of the Small Light-Weight Altitude Transmission Equipment SLATE III and SLATE III Mark I for the Federal Aviation Agency Systems Research and Development Services. The equipments operate at a transmitter frequency of 1090mc with a nominal peak power output of 300 watts, and a receiver frequency of 1030mc with a nominal sensitivity of -74dbm. SLATE III replies to Mode A (Identity) or Mode C (Altitude) interrogations. The reply codes include any of 64 codes (00-77) plus the Special Position Identification (SPI) or IDENT pulse on Mode A, and 158 codes on Mode C (altitude reporting at 100 foot intervals from -1000 to 14,7000 feet). Circuits are included which automatically prevent altitude reporting at 14,800 feet and above so that erroneous information will not be transmitted. Operation of the receiver and video processing and transmitter circuits is the same for both modes of operation. The decoding and reply encoding circuits function to cause transmission of replies to Mode A or Mode C interrogations on a first-come, first-served basis. (Author)

AD-600 827 Div. 1, 19
OTS Price $4.60

Seattle Development Lab., Minneapolis-Honeywll Regulator Co., Wash.
INTEGRATION OF HONEYWELL MODEL 7182 RADAR ALTIMETER INTO THE FA AUTOMATIC LANDING SYSTEM.
Final engineering rept.
8 Apr 64, rev. 49p. SDL Doc1116-1
Contract ARDS498

Unclassified report

Descriptors: (*Flight instruments, Altimeters), (*Altimeters, Flight tests), (*All-weather aviation, Airplane landings), (*Automatic pilots, Airplane landings), Air traffic control systems, Radar, Radio altimeters, Radio interference, Aircraft antennas.

NAFEC flight tests and evaluation demonstrated the feasibility of using the Honeywell radar altimeter as a component of the FAA landing system. The flight tests have shown no fundamental difficulty exists in the system concept and that the altimeters perform well their primary function of providing accurate altitude information to the landing system from altitudes of 100 feet down to zero. The flight tests also demonstrated that mutual interference effects do not degrade the performance of pulse radar altimeters in a dual installation. (Author)

Unedited rough draft trans. of Akademiya Nauk SSSR, Murmanskii Morskoi Biologicheskii Institut. Trudy, 1961, no. 3(7) p. 1-220

Descriptors: (*Marine biology, Oceanology), Echinodermata, Pelecypoda, Crustacea, Invertebrates, Plants (Botany), Plankton, Sea water, Ecology, Morphology (Biology), Scientific organizations, Fishes, USSR.

Contents: Typical features of temperature conditions in the water of the Murmansk coast in 1959, Procedure for the collection of phytoplankton, The morphology of early stages in the development of abundant species of Euphausiidae in the Barents Sea, The biology of the ctenophores of the Murmansk coast, A tactile conditioned reflex in the common starfish Asterias rubens L., Destruction of stomach tissues of the common starfish Asterias rubens L., The ways in which crustaceans adapt to changes in the chemical nature of the external environment, The survival rate of humpbacked salmon (Oncorhynchus gorbuscha Walb.) fry in relation to the mode of transfer from fresh to sea water, The active selective reaction of humpbacked salmon (Oncorhynchus gorbuscha Walb.) fry in relation to sea water, The pigment reaction of the cod to uniform and nonuniform backgrounds, Regeneration and somatic embryogenesis in Laomedea flexuosa Hincks, Phagocytic reactions in the course of the processes of regeneration and somatic embryogenesis in the lower coelenterates, A note on the morphological reactivity of the tissues of the mantle in Mytilus edulis L., Use of the concept of interspecific relationships in the study of the deep-sea bottom fauna, Some problems concerned with the reproductive ecology of sea bottom invertebrates with a pelagic mode of development, The extent to which higher aquatic plants are utilized by certain invertebrate phytophages (Based on the Yakhroma Reservoir on the Moscow-Volga Canal), The consumption of plant tissues by animals in the fresh waters of temperate latitudes, and The migrations of sexually immature cod and the reasons for variations in them.

AD-600 050 Div. 2
OTS Price $0.50

Aerospace Information Div., Washington, D. C.
PHENOMENA IN THE UPPER ATMOSPHERE: COMPILATION OF ABSTRACTS FROM SOVIET-BLOC LITERATURE.
Rept. no. 46
1 May 64, 16p
AID P64 32, TT 64-15404

Unclassified report

Report on Surveys of Soviet-Bloc Scientific and Technical Literature.

Descriptors: (*Upper atmosphere, Space environmental conditions), (*Abstracting, USSR), Atmosphere, Astrophysics, Geophysics, Solar radiation, Ionosphere.

Contents:
Solar radiation and the Ionosphere

AD-600 051 Div. 2
OTS Price $0.50

Aerospace Information Div., Washington, D. C.
PHENOMENA IN THE UPPER ATMOSPHERE: COMPILATION OF ABSTRACTS.
Rept. no. 45
12 May 64, 20p
AID P64 34, TT 64-15403

Unclassified report

Report on Surveys of Soviet-Bloc Scientific and Technical Literature.

Descriptors: (*Upper atmosphere, Space environmental conditions), (*Abstracting, USSR), Atmosphere, Astrophysics, Geophysics, Solar radiation, Atmospheric electricity, Meteorology.

AD-600 069 Div. 2
OTS Price $2.75

Geophysics Corp. of America, Bedford, Mass.
THEORETICAL AND OBSERVATIONAL STUDIES OF VORTEX CLOUD PATTERNS.
Final rept.
by Wen Tang, Edward M. Brooks, and Bruce F. Watson.
Jan 64, 142p GCA TR 64 2G
Contract Cwb10626

Unclassified report

Descriptors: (*Cloud cover, Vortices), (*Meteorology, Clouds), Atmospheric motion, Models (Simulation), Graphics, Theory.

The orientation, width, and spacing of the synoptic scale cloud bands in selected extratropical and tropical cyclones are related to meteorological parameters such as the horizontal and vertical variations of the wind. Several characteristic cloud band systems are found to be associated with each vortex. It is found that the approximate wind direction at cloud-top level is normal to the bands near the vortex center, oblique to the outer bands, and parallel to the smaller bands in the cold sector. A model is developed to account for the mechanics of cloud band evolution. This simple model explains a number of observed characteristics of vortex cloud band systems, including the above relationship between flow and band orientation. A simple three-dimensional theory concerning cloud formation and band patterns in hurricanes and in occluded extratropical cyclones is developed. The theory reveals the general cloud patterns in hurricanes--the rotating spiral band, the cirrus clouds radiating out from the center, and the cloud pattern inside the eye--and the cloud band in the inner core of an occlusion. These findings agree very well with the characteristics of cloud bands in these cases. (Author)

AD-600 074 Div. 2, 9
OTS Price $0.50

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
INVESTIGATION OF SHEAR ZONES IN THE ICE CAP MARGIN, THULE, GREENLAND.
Research rept.
by George K. Swinzow. Feb 64, 20p
Task 8X99-27-001-03;
CRREL RR93

Unclassified report

Descriptors: (*Glaciers, Shear stresses), Surface properties, Silt, Boulders, Ice islands, Greenland, Geology.

The shear moraine phenomenon of glaciers is examined in the light of new evidence collected in the general Tuto area during 1958-1959. The formation and composition of silt bands, some heavy accumulations of boulders and gravel, and streaks of clayey ice exposed during the excavation of two ice tunnels in the margin of the ice cap are described in detail. Surface investigations have furnished information on the location and concentration of the glacial ice-snow-drift ice interface, variations of silt, sand, and rock bands, and other materials produced by the shear surfaces. A general view of the outcropping shear moraines shows a tendency toward a broad arch-shaped pattern, perpendicular to the direction of flow and, in most cases, parallel to the ice edge. The distance from the ice edge varies from a few dozen feet at the ice cliffs to a half mile and more. Motion measurement between two ice levels is presented in the form of limiting angles on a velocity distribution curve. The indication of great variability in conditions at the edge of the moving ice is discussed in terms of contact zone between the glacier bottom and ground surface, nature of interaction occurring in zones containing glacier-ground surface interface, and mechanics of the migration of inclusion bands which occur during the formation of glacial shear moraines. (Author)

2. ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-600 011 Div. 2
OTS Price $2.75

Institute of Geodesy, Photogrammetry and Cartography, Ohio State Univ. Research Foundation, Columbus.
THE EFFECT OF TOPOGRAPHY AND ITS ISOSTATIC COMPENSATION ON FREE AIR GRAVITY ANOMALIES.
Scientific rept. no. 2
by Lassi Kivioja. Dec 63, 148p IGPC28
Contract AF19 628 2771; Proj. 7600; Task 760002AFCRL 64 130
Unclassified report

Descriptors: *Terrain, Isostatic change), (*Gravity, Geodesics), (*Geodesics, Gravity), Atlantic Ocean, North America, Air.

The effect of topography and its isostatic compensation for all 5 degree x 5 degree surface elements was calculated, using the T = 30 km, Airy-Heiskanen local isostatic system, and the available 5 degree x 5 degree mean free air anomalies based on measurements. Measured 5 degree x 5 degree mean free air anomalies on the Altantic Ocean, on the North American Continent, and at its shores were the test areas used for the adjustments. In the test areas, these calculated 5 degree x 5 degree mean free air anomalies represented the measured 5 degree x 5 degree mean free air anomalies so that the standard errors on the oceans were about ± 6 mgal, on continents and at the coasts about ± 11 mgal. The calculated anomalies were developed into spherical harmonics up to the 8th order. Also, 5 degree x 5 degree mean free air anomalies for the entire Earth are given, consisting of 5 degree x 5 degree mean free air anomalies based on measurements wherever available as given by Uotila, and the remaining 5 degree x 5 degree elements have anomalies extrapolated from known and calculated anomalies. Mean elevations for all 5 degree and 5 degree elements were estimated, and are given in meters. The mean effect of topography and its isostatic compensation of the Hayford zones 18 - 1 is given in the Airy-Heiskanen, T = 30 km isostatic system for every 5 degree x 5 degree surface element. (Author)

AD-600 012 Div. 2
OTS Price $2.00

Institute of Geodesy, Photogrammetry and Cartography, Ohio State Univ. Research Foundation, Columbus.
GEODETIC EXPERIMENT BY MEANS OF A TORSION BALANCE.
Scientific rept. no. 3
by Ivan I. Mueller, Orlando Holway, III, and Robert B. King, Jr. Dec 63, 77p IGPC-30
Contract AF19 628 2771; Proj. 7600; Task 760002;AFCRL 64 131
Unclassified report

Descriptors: (*Geodesics, Experimental data), (*Balances, Gravity), Equations, Theory, Tests.

The Eotvos torsion balance offers several possiblities in geodetic applications of which the most important are: the interpolation of deflections of the vertical and of geoid undulations between reference stations,where gravity material is not sufficient; the determination of the geopotential values in a given area for the purpose of leveling reductions; the determination of the radius of curvature of the plumb line for reducing astronomical coordinates to the geoid; and to investigate curvature properties of the equipotential surface for more accurate base line reductions to the ellipsoid of reference. The paper after theoretical considerations accounts for an experiment conducted in the south-west section of Ohio.

/AD-600 015 Div. 2
OTS Price $4.60

McGill Univ. Montreal (Quebec)
EVAPORATION AND SENSIBLE HEAT FLUX OVER THE ARCTIC OCEAN.
Scientific rept. no. 10
by E. Vowinckel and Bea Taylor. Mar 64, 44p AMPR PM 66
Contract AF19 604 7415, Proj. 8623, Task 862303
AFCRL, 64-272
Unclassified report

Arctic Meteorology Research Group Pub. in Meteorology no. 66.

Descriptors: (*Evaporation, Arctic Ocean), (*Heat transfer, Arctic Ocean), (*Arctic Ocean, Meteorology), Marine meteorology, Numerical analysis, Tables.

These fluxes were calculated for each month over the Polar Ocean and the Norwegian-Barents Sea. Sverdrup's evaporation formula was used, and it was first examined how the K-coefficient in that formula depends on the wind speed frequency distribution. Seasonal maps were constructed of mean wind speed. Previously obtained surface temperatures were used, but some additional examinations were carried out, using various assumptions for extreme surface temperatures in summer and winter. Evaporation and sensible heat flux were calculated separately for the following areas: Central Polar Ocean, Kara-Laptev Sea, East Siberian Sea, Beaufort Sea, and belts of 5 degrees latitude of the Norwegian - Barents Sea. The values for the different areas are presented in tables and figures. Evaporation over ice surfaces has a double maximum - in spring and fall - and a main minimum in winter. Over open water surfaces the evaporation shows a summer minimum and a broad maximum in winter. If small parts of the ocean were to remain open longer in fall, or during the whole winter, the heat loss would increase very rapidly. (Author)

AD-600 023 Div. 2
OTS Price $0.75

Rand Corp., Santa Monica, Calif.
THE DISTRIBUTION OF GASES IN THE PROTO-PLANETARY NEBULA.
by J. R. Jokipii. May 64, 21p RM3977PR
Contracts AF49 638 700; NAS7 100
Unclassified report

Descriptors: (*Astrophysics, Nebulae), (*Nebulae, Gases), (*Gases, Distribution), Solar systems, Magnetic fields, Models (Simulations), Theory, Helium group gases.

It is demonstrated that the distribution of elements in the solar system may be connected with solar magnetic fields. Relative diffusion of neutral particles and ions in a magnetic field (ambipolar diffusion) separates elements of different ionization potential. A simple model of the origin of the solar system which takes account of ambipolar diffusion successfully predicts relative terrestrial abundances of the noble gases Ne, A, Kr, and Xe. (Author)

AD-600 039 Div. 2, 16
OTS Price $5.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio
TRANSACTIONS OF THE MURMANSK MARINE BIOLOGICAL INSTITUTE.
27 Jan 64, 396p
FTD TT-63-663; TT 64-11640
Unclassified report

AD-600 156 Div. 2, 20
OTS Price $2.00

Solid State Radiations, Inc., Los Angeles, Calif.
A HIGH ENERGY PROTON SPECTROMETER UTILIZING SEMICONDUCTOR DETECTORS FOR SPACE PHYSICS EXPERIMENTATION.
Technical documentary rept. 1 Jun 62-31 Dec 63
by Henry S. Katzenstein and Frank P. Ziemba. Apr 64, 72p
Contract AF33 616 8340, Proj. 7360, Task 736003
ML TDR64 1

Unclassified report

Descriptors: (*Nuclear radiation spectrometers, Design), (*Solar radiation, Protons), (*Protons, Nuclear spectroscopy), Van Allen radiation belt, Cosmic rays, Solar flares, Semiconductor devices, Space flight, Circuits.

High energy protons are found in primary cosmic radiation, in the Van Allen Belt and in solar flares. A study of the best methods of observing these phenomena using semiconductor nuclear particle detector technique developed in part in the previously reported phases of this program resulted in three basic designs for proton spectrometers for for space radiation measurements. These are comprised of (1) the single detector with pulse height analysis, (2) a wide angle proton spectrometer, and (3) a high angular resolution proton spectrometer. Of these three designs, the third was selected as being capable of providing the best quality of information within the existing state of the art. A design for a ten channel spectrometer covering the energy range from 24 to 210 Mev in approximately equal logarithmic steps was completed, and on the basis of this design, fabrication was undertaken on an actual prototype spectrometer. Two flight spectrometers were fabricated and environmentally tested. Limited nuclear testing with protons up to 40 Mev verified the energy calibration of the first two channels and verified the calculated angle of acceptance. While size and weight considerably exceeded original estimates, a high degree of reliability and reproducibility was achieved. (Author)

AD-600 235 Div. 2
OTS Price $1.25

Electrical Engineering Research Lab., Univ. of Texas, Austin.
OPERATION AND PERFORMANCE OF THE CEDAR HILL METEOROLOGICAL TOWER FACILITY.
Final rept.
by W. S. Mitcham and K. H. Jehn. 31 Jan 64, 49p EERL4 10
Contract AF19 628 2459, Proj. 7655, Task 765501
AFCRL 64 306

Unclassified report

Descriptors: (*Weather stations, Operation), (*Meteorology, Meteorological instruments), Meteorological parameters, Texas, Measurement, Errors, Data processing systems, Punched cards.

Acquisition of wind and temperature data over a range of heights extending from 30 to 1,421 feet above ground level was carried on at Cedar Hill Tower Meteorological Research Facility from 1960 to 1963. System operations were main tained on an essentially continuous, around-the-clock schedule during most of that period and about three years of data were collected. The purpose of this report is to provide an evaluation of the performance of the data acquisition system month-by-month over its entire lifetime and to describe in detail the procedures which were evolved for monitoring the technical aspects of the system. Thus, discussion is restricted chiefly to the problem of analyzing the characteristics of the instruments with a view to enabling estimation of the accuracy of the data. The underlying aim of the data acquisition program at Cedar Hill was to promote research on the subject of the low level jet.

AD-600 241 Div. 2, 24
OTS Price $1.50

Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Va.
EVALUATION AND TEST OF A SINGLE-COLOR ELECTROSTATIC PRINTING MACHINE FOR THE REPRODUCTION OF TOPOGRAPHIC MAPS AND CHARTS.
Technical rept.
by Ralph L. Marzocco and Frederick C. Myers. 21 Jan 64, 52p
Task 1S643315D57703
GIMRADA +9-TR

Unclassified report

Rept. on Xerography, Application to Map Reproduction.

Descriptors: (*Electrophotography, Mapping), (*Maps, Reproduction), (*Photographic techniques, Effectiveness), Electrostatics, Printing, Color photography.

This report covers the evaluation and test of a single-color electrostatic printing machine for reproducing 22 1/2 by 30-inch topographic maps from 70-mm microfilm originals on photoconductive paper utilizing liquid immersion development. This report evaluates the accuracy, resolution, registration, alignment, distortion, halftone and continuous-tone capability, speed, maximum image area, over-printing, sheeting, and other capabilities of the machine and system for use in printing topographic maps. The report concludes that: (a) The electrostatic printing machine is suitable for the reproduction of multicolor topographic maps from 70-mm transparencies. (b) The electrostatic printing process utilizing liquid immersion development has fully demonstrated the capability of reproducing acceptable multicolor topographic maps for field use. (c) The machine design of the single-color electrostatic printing system is sound and the machine processing components are satisfactory for use in the multicolor electrostatic printing machine. (Author)

AD-600 254 Div. 2
OTS Price $2.60

Minnesota Univ., Minneapolis.
SHORT PERIOD MICROSEISMIC STUDY AT SKULL CLIFF, ALASKA.
Technical rept. no. 2
by James J. Olson and Harold M. Mooney. Feb 64, 21p
Contract Nonr710 44

Unclassified report

Descriptors: (*Microseisms, Alaska), (*Alaska, Seismology), Geophysics, Noise, Background, Frequency analyzers, Seismic waves.

Seismic background noise was measured at a location on the Arctic coast of Alaska. Continuous high-speed records were obtained with calibrated amplitudes. Frequency response extended from 1 to 100 cps (.01 to 1 second periods). The records were digitized in order to compute power spectra. The most striking result was the existence of a spectral peak at approximately 12 cps (.07 to .12 second period). Maximum amplitudes of ground vibration correlated well with ocean surf activity, as well as with barometric lows, maximum wave heights, and maximum wind velocities. Amplitudes differed by a factor of 10 between conditions of quiet and active surf, with peak-to-peak ground displacements of the order 0.01 and 0.1 microns, respectively. The shape of the power spectra and the position (on the frequency scale) of the spectral peak were largely independent of surf activity and the other factors noted above. (Author)

AD-600 075 Div. 2, 9
OTS Price $1.25

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
DYNAMIC RESPONSE OF SNOW TO HIGH RATES OF LOADING.
Final rept.
by H. Napadensky. Mar 64, 45p
Contract DA11 190ENG127; Task 8S66 02 001-02
CRREL RR119

Unclassified report

Descriptors: (*Snow, Mechanical properties), Loading (Mechanics), Tests, Explosions, Shock waves, Propagation, Fluid dynamic properties.

An experimental investigation of stress-wave propagation in snow and ice is described. Seven types of Greenland snow were investigated to determine the extent to which the variation in dynamic response of the snow is a function of snow types, and were compared with results of similar Michigan snow experiments. A low-density explosive charge was detonated, sending a steep-fronted shock wave through a metal transfer plate and into the snow sample, compressing the snow and setting it in motion. Measurements were made on shock waves with amplitudes of less than 200 atm. Density and pressure behind the wave fronts were determined by simultaneous measurement of wave-propagation and particle velocity as limited by the fast elastic wave and the slow plastic wave of the two-front structure. Values calculated by the Rankine-Hugoniot jump conditions determined the points at which the material behaves plastically or hydrodynamically. The maximum stable pressure-volume states that snow can reach under shock loading are also shown. Sources of scatter in the results from variations in snow type and errors in data reduction and geometry changes are pointed out. (Author)

AD-600 078 Div. 2
OTS Price $1.25

Meteorological Satellite Lab., Weather Bureau, Washington, D. C.
METEOROLOGICAL PRODUCTS FROM DIGITIZED SATELLITE VIDICON CLOUD PICTURES.
by C. L. Bristor and W. M. Callicott. Jan 64, 41p
WB-MSL 26

Unclassified report

Descriptors: (*Meteorological satellites, Data transmission systems), (*Pictures, Clouds), (*Data processing systems, Computers), Weather forecasting, Photographic techniques, Digital systems.

Procedures are described whereby digitized vidicon cloud photos will be computer processed. Data rates, preprocessing as well as rectification and mapping are discussed and problem areas are indicated. The kinds of output are described and products from various display devices are provided through checkout samples. (Author)

AD-600 103 Div. 2, 25
OTS Price $0.75

United Electrodynamics, Inc., Alexandria, Va.
SYNTHETIC EARTHQUAKE SEISMOGRAMS FOR TELE-SEISMIC DISTANCES.
by Robert Van Nostrand. 14 May 64, 24p Seismic DLR104
Contract AF33 657 12447,

Unclassified report

Report on Vela-Uniform Project.

Descriptors: (*Seismology, Seismic waves), Earthquakes, Underground explosions, Tests, Models (Simulations)

The purpose of this study was to test the hypothesis that the initial train of P-waves on seismograms recorded at teleseismic distances is more complicated for earthquakes occurring in the crust than for explosions near the earth's surface. Both pure compressional and pure shear sources, and some combination sources, were assumed in separate computations. 'Spike' seismograms were first constructed and then convolved with an assumed source signal to obtain the complete synthetic seismogram. It was shown, as expected, that a buried source produces more multiply-reflected waves than does a surface source; in turn, other things being equal, an SV-source yields more than a P-source. Only the first surface-reflected multiple exhibits an amplitude comparable to that of the primary wave. Synthetic seismograms using a combined SV-P source are similar to real earthquake seismograms. However, whether a near-surface earthquake yields a more complex train of P-arrivals than does an explosion depends greatly on the ratio of SV-energy to P-energy in the earthquakes source, as well as on the relationship between them. (Author)

AD-600 128 Div. 2
OTS Price $2.75

RAND Corp., Santa Monica Calif.
WEATHER INFORMATION: ITS USES, ACTUAL AND POTENTIAL.
by R. R. Rapp and R. E. Huschke. May 64, 132p,
RM4083USWB
Contract Cwb10772

Unclassified report

Descriptors: (*Weather forecasting, Effectiveness), Economics, Sociology.

This report represents The RAND Corporation's portion of a study conducted by the U.S. Weather Bureau to determine the impact of research in the atmospheric sciences on the social and economic activities of the nation. This report is devoted largely to a discussion of the benefit to be derived from improved weather information. The thesis is advanced that weather information has value principally because it leads many people and organizations to make the decisions that counter the deleterious effects of weather. This hypothesis is then used both to explicate the difficulties of evaluating atmospheric research in economic terms and to suggest techniques for improving weather information and estimating the value of weather information thus improved.

AD-600 154 Div. 2
OTS Price $0.50

Yale Univ., New Haven, Conn.
SEARCH FOR PLANETARY OPTICAL EMISSION, AND STUDY OF FLARE ACTIVITY OF NEARBY STARS.
Final rept.
20 May 64, 6p
Grant NonrG00014 63, Proj. NR046 778,

Unclassified report

Descriptors: (*Solar flares, Stars), (*Spectrophotometers, Astrophysics), (*Aurorae, Jupiter), Magnetic fields, Noise (Radio), Radio astronomy, Telescopes.

An effective 20-inch reflecting telescope at the Yale Observatory Bethany Station was constructed. Also, a unique dual-channel pulse-counting photoelectric spectrophotometer, capable of a variety of astronomical problems in addition to those so far attempted, and especially effective for a New England climate by being able to work without loss of accuracy through haze and thin clouds, was constructed. Certain modern photomultipliers were tested hitherto unreported effects in their behavior were detected. It was demonstrated that Jovian H alpha auroras are absent, to unexpectedly low levels, and that search for Jovian auroras should now probably be carried out using other possible lines or bands. Preliminary indications are that strong H alpha flares are not of great frequency in late K dwarfs.

regions of middle latitudes. In the tropics the most significant feature of the climate is that the daily range of temperature commonly exceeds the annual range. In middle and high latitudes the reverse situation prevails. For a description of the temperature and humidity regions in the tropics it is essential that data be available for every hour of the day. In the higher latitudes of the 35 degrees N to 35 degrees S zone there is a significant seasonal variation of temperature and humidity, particularly over continental areas. (Author)

AD-600 367 Div. 2
OTS Price $0.75

Uppsala Univ. (Sweden).
SPECTRAL VARIATIONS DURING COSMIC RAY STORMS.
Technical note no. 4
by B. O. Gronkvist. 20 Mar 64, 21p
Contract AF61 052 614
AFCRL 64 395

Unclassified report

Descriptors: (*Cosmic rays, Storms), (*Storms, Cosmic rays), Nuclear spectroscopy.

Three cosmic ray storms during the IGY, which differ as to the type, have been treated for a study of changes in the effective integral rigidity spectrum. The time dependence of the exponent gamma of the spectrum is illustrated for the rigidity region 11-18 GV with a time resolution of two hours. An analytical expression is given where changes in the effective integral spectrum are transformed into changes in the primary spectrum. The extreme values of these changes vary from one storm to another. An extension of the treatment to lower rigidities is discussed. (Author)

AD-600 368 Div. 2
OTS Price $0.75

Oslo Univ. (Norway).
A COMPUTATION OF THE VERTICAL CIRCULATION IN A FRONTAL ZONE FROM THE QUASI-GEOSTROPHIC EQUATIONS.
Technical note no. 4
by M. Todsen. 8 Jan 64, 26p
Contract AF61 052 525
AFCRL 64 246

Unclassified report

Descriptors: (*Air mass analysis, Differential equations), (*Meterology, Theory), (*Atmospheric motion, Numerical analysis), Meteorological charts, Weather forecasting, Geophysics.

The diagnostic differential equation for the stream function of the non-geostrophic motion in a frontal zone is solved numerically from observed data of a cold front. The effect of condensation on the vertical circulation is considered. The picture of the total transverse motion shows that both cold and warm air take part in the ascent along the front. (Author)

AD-600 369 Div. 2
OTS Price $1.00

Uppsala Univ. (Sweden).
COSMIC RAY INTENSITY VARIATIONS DURING 1963.
Technical note no. 3
by A. E. Sandstrom, E. Dyring, L. Ekstrom, B. O. Gronkvist and S. Lindgren. 15 Mar 64, 33p
Contract AF61 052 614
AFCRL 64 394

Unclassified report

Descriptors: (*Cosmic rays, Intensity), Radiation monitors, Telescopes, Neutrons, Analysis of variance.

During 1963 the recorders have continued in Uppsala and Kiruna by one neutron monitor, two cubical telescopes and six inclined telescopes. Tables and figures give a detailed account of diurnal and semidiurnal variations during the year. A sharp phase shift in the semidiurnal variation can be found for the neutron monitor. Five decreases are illustrated by bihourly diagrams. (Author)

AD-600 372 Div. 2
OTS Price $0.50

RAND Corp., Santa Monica, Calif.
RADIAL DISCRETIZATION IN SPHERICAL GALAXIES.
by T. Y. Thomas. May 64, 8p RM411ORC

Unclassified report

Descriptors: (*Galaxies, Measurement), Stars, Astronomy, Astronomical data, Mathematical analysis, Equations, Wave functions, Spheres.

This report extends one avenue of previous RAND work on galactic scale discretization to obtain a five-parameter discretization for the diameter of spherical galaxies.

AD-600 388 Div. 2
OTS Price $0.50

Oregon State Univ., Corvallis.
WEST COAST LINEARITY RUN TO DETERMINE CALIBRATION FACTOR OF LaCOSTE-ROMBERG GRAVITY METER S-9.
Data rept. no. 13
by Peter Dehlinger and E. E. Chiburis. Dec 63, 13p
OSC ref 63 35
Contracts Nonr1286 09; Nonr1286 10; Projs. NRO83 600; NRO83 102

Unclassified report

Descriptors: (*Oceanographic data, Gravity), (*Least squares method), Calibration, Tables, Shipborne.

The calibration factor of LaCoste-Romberg surface-ship gravity meter S-9 was checked against a 1200 mgal range of land base stations along the West Coast of the United States. Previous checks at other base stations provided conflicting results as to the accuracy of this meter's calibration factor supplied by the manufacturers. Results of the West Coast base station checks provided a calibration factor which is within 0.1% of that provided by the manufacturers. A revised calibration table was calculated and is presented in this report for use with meter S-9. (Author)

AD-600 400 Div. 2, 6, 12
OTS Price $3.00

Friez Instrument Div., Bendix Corp., Baltimore, Md.
AIR LAUNCHED ROCKETSOUNDING STUDY.
Final rept.
by C. P. Blackburn and D. B. George. Apr 64, 166p EIR549
Contract AF19 628 3264; Proj. 6020; Task 602001
AFCRL 64 127

Unclassified report

Descriptors: (*Sounding rockets, Meteorological instruments), (*Atmospheric sounding, Sounding rockets), Meteorological instruments), Airborne, Launching, Rocket motors, Radiosondes, Design, Rocket components.

The results of a program to study, evaluate and recommend the most feasible techniques and equipment for an air launched rocket sounding system compatible with the AN/AMQ-19 Meteorological system are presented in this report. The purpose of the rocketsounding system is to extend the meteorological data envelope to an altitude of 120,000 feet and to provide a growth capability for future expansion to 250,000 and the area between 400,000 and 600,000 feet.

Division 2 - ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-600 268 Div. 2
OTS Price $0.75

Harvard Coll., Cambridge, Mass. Observatory.
RESEARCH DIRECTED TOWARD THE INVESTIGATION OF SOLAR PHENOMENA.
Final rept., 1 Jan 59-28 Feb 64.
by Barbara Bell and Donald H. Menzel. Feb 64 28p
Contract AF19 604 4962; Proj. 7649; Task 764901
AFCRL 64 275

Unclassified report

Descriptors: (*Solar radiation, Solar disturbances), (*Solar spectrum, Scientific research), (*Solar corona, Scientific research), Solar flares, Sunspots, Terrestrial magnetism, Magnetic storms.

The research falls into the following major categories: (1) Solar-terrestrial correlations, relating geomagnetic disturbance and solar proton (PCA) events to such solar features as the location (north or south of the solar equator) and magnetic class of the flaring sunspot, radio bursts of spectral types II and IV and various properties thereof, and the brightness of the green coronal line. (2) Studies of solar prominences, involving both measurement and classification of observed prominences, and theoretical investigation of their structure and of physical processes important in their formation. (3) Studies of the rocket ultraviolet solar spectrum, with special attention to the Lyman-alpha line of hydrogen as a major source of opacity over several hundred angstroms. (4) Work on the calculation of theoretical transition probabilities for complex atoms. (5) Studies of other solar features including the sunspot zone, the positional relation of flares to sunspots, details of the solar disk in the light of H alpha, activity zones in the emission-line corona. (6) Miscellaneous theoretical analyses of solar seeing and of the influence of various atmospheric contaminants on the brightness of the daytime sky. (Author)

AD-600 292 Div. 2, 3
OTS Price $0.50

Naval Research Lab., Washington, D. C.
CHARACTERISTICS OF AIR FILTER MEDIA USED FOR MONITORING AIRBORNE RADIOACTIVITY.
by L. B. Lockhart, Jr., R. L. Patterson, Jr., and W. L. Anderson. 20 Mar 64, 19p
NRL 6054

Unclassified report

Descriptors: (*Radiation monitors, Design), (*Gas filters, Air), (*Air pollution, Monitors), (*Radioactivity, Airborne), Aerosols, Fission products, Natural radioactivity, Phthalates, Cellulose, Asbestos, Tensile properties, Thickness, Density, Absorption.

A comparison was made of the more important characteristics of the available filter materials which are currently in use by various systems for monitoring airborne radioactivity throughout the world. Most of the materials described are commercially available; the information herein is presented with the hope that it will be of use to those whose programs involve the employment of air-filter media or who require such information for the design of air-filter systems. The filter characteristics measured are such physical properties as tensile strength, thickness, density, ash content, retentivity toward 0.3 micron dioctyl phthalate (DOP) aerosol particles as a function of air velocity, retentivity toward airborne fission products and natural radioactive aerosols (radon daughters) at several air velocities, flow rate as a function of pressure drop across the filter, and the relative rates of clogging by atmospheric dust. The observation of a rapid change in flow with dust loading of some of the filter media suggests the systematic study of such changes as possibly a simple procedure for monitoring the dust content of the atmosphere. (Author)

AD-600 300 Div. 2, 12
OTS Price $2.60

Air Force Cambridge Research Labs., Bedford, Mass.
THE STATUS OF TROSPHERIC WIND PROFILES FOR AEROSPACE VEHICLE DESIGN.
Interim Notes on Atmospheric Properties.
by Norman Sissenwine. 15 Oct 63, 22p
AFCRL INAP37

Unclassified report

Descriptors: (*Wind, Troposphere), (*Jet streams (Meteorology), Data), Metorology, Gusts, Gust loads, Aerospace craft, Design, Ascent trajectories, Troposphere, Guidance, Guided missile simulators.

This note presents boost wind profile design criteria for U. S. and world wide consideration generally applicable to a 1 percent calculated risk windiest-season-design-philosphy. Preliminary design criteria are presented in the form of wind speed versus altitude curves which should be applied in the most adverse direction. The most advanced of the preliminary, techniques provided herein require application of an additional fudge factor which has been determined through computerized vehicle flight experience. A brief discussion is provided on the consideration of a gust or family of gusts on the design of aerospace vehicles. Available data considered most applicable to the problem of considering the effect of a single gust is provided. No information is included on the detailed wide profile applicable to the dynamic effects resulting from interaction with a family of gusts, since recently developed detailed wind soundings systems have not yet been proven. Such data is foreseen as available in the near future.

AD-600 304 Div. 2
OTS Price $1.60

Stanford Research Inst., Menlo Park, Calif.
LOCAL SEISMIC MONITORING AT SHOAL.
Preliminary rept., Jul 61-21 Oct 63.
by W. H. Westphal and G. S. Brink, 15 Nov 63, 11p

NP 13757

Unclassified report

Report on Vela Uniform, Project Shoal.

Descriptors: (*Seismology, Instrumentation), Underground explosions, Nuclear explosions, Seismic waves, Seismographs, Nevada.

Local seismic monitoring was initiated in the Fairview Peak region of Nevada in July 1961, and was conducted at intervals until 21 October 1963, five days prior to SHOAL Event. Since that date, continuous measurements have been made at three seismograph stations located approximately 10 km northeast, 10 km southwest, and 3.4 km west of ground zero. Preliminary evaluation of data accumulated through November 11 indicates that the majority of these events had their epicenters in the Fairview Peak fault block; this was true also of the majority of recorded preshot events. (Author)

AD-600 318 Div. 2
OTS Price $1.00

C-E-I-R, Inc., Boston, Mass.
CLIMATIC FREQUENCIES FOR LOW LATITUDE STATIONS.
Final rept.
by James Misho. Jan 64, 37p
Contract DA19 129QM1971, Proj. 7X83 01 008

Unclassified report

Descriptors: (*Climatology, Tables), (*Tropical regions, Climatology), Temperature, Humidity, Meteorology.

The purpose of the tables and figures presented is to depict the temperature and humidity regimes in the zone between 35 degrees N and 35 degrees S. This area comprises the tropics and the equatorward portion of the temperature

This report is a continuation of the current observational program and presents data on ice thickness during the 1960-61 and 1961-62 seasons. The network has been expanded to Alaska during this period and some station changes have taken place. These changes are discussed and some supplemental ice thickness data for two stations on the east coast of Greenland are presented. The data are presented in their original form in order to make them fully available to potential users. Analysis has been limited to a study of maximum ice thicknesses. (Author)

AD-600 508 Div. 2
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE MOON UNDER KLIEGLIGHTS.
by Herbert Pfaffe. 4 May 64, 5p
FTD TT64 336 TT 64 11718

Unclassified report

Unedited rough draft trans. from Berliner Zeitung (East Germany) 1963, 5 Apr, p. 5.

Descriptors: (*Moon, Theory), (*Astrophysics, Moon), Lasers, Radio astronomy, Extraterrestrial topography, Lunar probes, USSR.

A method of moon observation is discussed, which is based on laser optics. It provides for the generation of short, very high-energy light pulses which are directed towards the moon. In this manner, regions of the moon can be irradiated with artificial light, in the visible spectral range, so that this spot-light type illumination can be seen from the earth. Also, a generalized discussion of what must be scientifically done, by the direct observation of the moon from the earth as well as by the direct exploration of the moon surface with space vehicles, before the first space traveler can safely set foot on the surface of our satellite.

AD-600 535 Div. 2
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ON THE QUESTION OF THE DAILY VARIATION OF CLOUDINESS IN THE SOVIET UNION.
by O. D. Kondrau. 28 Apr 64, 15p
FTD TT63 1205; TT 64 11715

Unclassified report

Trans. of Glavnaya Geofizicheskaya Observatoriya Leningrad. Trudy 1963, no. 142 204 p. 22-31.

Descriptors: (*Cloud cover, Diurnal variations), Atmospheric motion, Heat transfer, Moisture, Measurement, Climatology, Meteorology, USSR.

The greatest changes in cloudiness (in its daily variation) are observed in the hours closest to sunrise and sunset. In connection with this, consideration of the synoptic observation data in those periods which are close to 0700, and 1900 mean solar time is most important. The greatest amplitude of the daily variation of cloudiness must be expected in the mountains of Central Asia. For example, at the Tien Shan station in July the mean daily amplitude of the probability of clear and overcast skies for the lower clouds was about 50%. On the basis of the data examined in the work on the daily variation in the mean cloudiness and the probability of clear or overcast skies for isolated points, it is possible to conclude that with existing methods of visual observations, 12 observation periods by mean solar time are sufficient for complete climatological characterization of cloudiness in the territory of the USSR. (Author)

AD-600 575 Div. 2, 15, 30
OTS Price $1.75

Northwestern Univ., Evanston, Ill.
MULTIPLE DISCRIMINANT FUNCTIONS.
Technical rept. no. 11
by Emilio Casetti. May 64, 67p
Contract Nonr1228 26, Proj. NR389 135

Unclassified report

Descriptors: (*Programming (Computers), Scientific research), (*Earth, Scientific research), (*Functional analysis, Programming (Computers)), Functions, Factor analysis, Statistical analysis, Instruction manuals.

This report is one of a series of computer program manuals arising from a continuing study of computer applications in the earth and environmental sciences, including geology, geography, geophysics, geochemistry, and environmental engineering. The present document contains a discussion of multiple discriminate functions and it provides an example of computer-aided classification using such functions. Other phases of our current classification work deal with the general problem of discriminate iterations, and this work will provide the basis for a subsequent report.

AD-600 598 Div. 2
OTS Price $2.25

Minnesota Univ., Minneapolis. School of Physics.
ATMOSPHERIC PHYSICS RESEARCH.
Annual progress rept.
Apr 64, 92p
Contract Nonr710 22

Unclassified report

Descriptors: (*Atmosphere, Scientific research), Dust, Aerosols, Ions, Distribution, Measurement, Instrumentation, Physics.

Measurements of the vertical distribution of dust in the atmosphere suggest the presence of particulate matter in sufficient quantities to affect the ion concentration. A project was initiated in September 1962 to measure the total ambient aerosol concentration in the stratosphere and the associated size distribution. The variations of atmospheric ozone with altitude, the seasons, over a period of days and even over a period of several hours was studied. The data included in this report was collected from August 1962 to September 1963. On many of the flights both ascent and descent measurements were obtained, thus permitting the study of ozone variation which may occur within the period of several hours.

AD-600 620 Div. 2
OTS Price $0.75

Woods Hole Oceanographic Institution, Mass.
PERFORMANCE RECORD OF MOORED BUOY SYSTEMS.
by Paul B. Stimson. Mar 64, 22p WHOI Ref64 14
Contract Nonr3351 00; Proj. NRO83 501

Unclassified report

Descriptors: (*Buoys, Mooring), Velocity, Measurement, Turbulence, Instrumentation, Failure, Life expectancy, Theory, Cordage, Damage, Performance (Engineering), Ocean currents.

From December, 1960, to the present, one hundred twenty-six Richardson-type buoy stations have been set. The recoveries and losses are herein recorded, and the causes of failure and life expectancy are treated in some detail. It is believed that most of the failures have been due to biological attack; evidence in support of this theory is presented. (Author)

Division 2 - ASTRONOMY, GEOPHYSICS AND GEOGRAPHY

AD-600 407 Div. 2
OTS Price $0.75

Lamont Geological Observatory, Palisades, N. Y.
OCEANOGRAPHIC RESEARCH.
Progress rept. no. 7, 1 Jan-31 Dec 63.
31 Dec 63, 30p
Contract Nonr266 48

Unclassified report

Descriptors: (*Oceanology, Scientific research), Oceanographic equipment, Marine biology, Marine geology, Marine geophysics, Oceans.

Included in this program are studies in marine geology-sedimentation, structure and tectonics, topography and physiography; marine geophysics - seismology, both reflection and refraction, gravity, magnetics and heat flow; marine biology - abyssal fauna, microbiology and ecology of living plankton; and oceanography - physical and dynamical. (Author)

AD-600 410 Div. 2, 30, 25
OTS Price $0.50

Princeton Univ., N. J. Observatory.
BALLOON PROJECT.
Progress rept., Apr 63-Apr 64
by Martin Schwartzschild. Apr 64, 11p
Contract Nonr1858 03, Grant NSF G5464

Unclassified report

Descriptors: (*Balloons, Helium), (*Telescopes, Scientific research), Television, Scientific research, Telescopes, Mirrors, Optical equipment, Infrared telescopes, Mars.

AD-600 448 Div. 2,
OTS Price $8.60

Washington Univ., Seattle.
DISTRIBUTION OF BEACH SEDIMENT NEAR THE COLUMBIA RIVER.
Technical rept. no. 98
by Ronald L. Ballard. Feb 64, 91p WU Ref M64 16
Contracts AT45 1 1725, Nonr477 10, Proj. 083 012

Unclassified report

Descriptors: (*Sedimentation, Water waves) (*Estuaries, Erosion) (*Beaches, Rivers, Washington, Oregon, Geology, Climate, Oceanology, Minerals, Sources.

The coastline near the Columbia River, between Tillamook Head, Oregon and Grays Harbor, Washington, is characterized by prograding beaches in contrast to the rest of the Washington-Oregon coast where actively eroding sea cliffs are present. The Columbia River appears to be the major contributor of sediment to the beaches and probably accounts for their prograding character. Littoral transport of material from coastal erosion probably has some effect on the sediment budget, but coastal barriers of promontories and estuaries limit influx of this material. Some material is added to the beach as a result of jetty breakdown, especially near Grays Harbor, Washington. Willapa Bay apparently contributes only minor amounts of sediment to the area. The net direction of beach sediment movement near the Columbia River appears to be northward. Seasonal changes in the direction of wave attack complicate the analysis, but the greater energy associated with winter wave conditions is directed northward and probably results in a predominant northerly sediment movement. Mechanical and heavy mineral analyses are consistent with the results of wave studies..

AD-600 463 Div. 2
OTS Price $0.50

Oregon State Univ., Corvallis.
OREGON STATE UNIVERSITY SEISMOLOGICAL BULLETIN NO. 1, JULY 1 to SEPTEMBER 30, 1963.
Data rept. no. 14.
by M. M. Collver and Peter Dehlinger. Dec 63, 11p
OSC Ref 63 36
Contract af19 628 2778 and Nonr1286 10, Proj. NR083 102

Unclassified report

Descriptors: (*Seismology, Periodicals), Seismological stations, Universities, Oregon, Seismic waves, Data, Geophysics.

The Oregon State University seismic station at Corvallis is one of the World-Wide Cooperative Standard Seismograph Network of stations. The station includes three-component Benioff short-period seismographs (T sub O, = 1 sec, T sub g = 0.75 sec); three-component Sprengnether long-period seismographs (T sub O = 30 sec, T sub g = 100 sec); and an additional small vertical Benioff seismograph (T sub O = 1.0 sec, T sub g = 1.0 sec) with visual recording on the campus of the university. (Author)

AD-600 472 Div. 2
OTS Price $6.60

Lockheed Missiles and Space Co., Sunnyvale, Calif.
A SEMI-THEORETICAL MODEL FOR ATMOSPHERIC PROPERTIES FROM 90 TO 10,000 KM.
by Albert D. Anderson and William E. Francis.
May 64, 63p LMSC6 74 64 19
Contract DA49 146XZ204
DASA 1502

Unclassified report

Descriptors: (*Upper atmosphere, Atmosphere models), (*Atmosphere models, Upper atmosphere), Solar radiation, Sunspots, Ionosphere, High altitude, Time, Nuclear explosions, Theory.

A semi-theoretical model of the upper atmosphere was constructed to allow the calculation of the primary atmospheric properties from 90 to 10,000 km altitude as a function of local time and solar activity. The calculations are based upon an empirical density profile from a density model as the initial input. Assuming diffusive equilibrium above 110 km and isothermal conditions above 400 km, the remaining properties (pressure, temperature, mean molecular mass, and the individual particle concentrations) are derived by using the hydrostatic equation and equation of state, together with boundary values from measurements. To illustrate the model, two tables are given that present the average atmospheric properties vs altitude for sunspot maximum and minimum conditions, respectively, for the months immediately following the Argus (September 1958) and Starfish (July and August 1962) high-altitude nuclear detonations. (Author)

AD-600 483 Div. 2
OTS Price $9.60

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
ICE THICKNESS OBSERVATIONS, NORTH AMERICAN ARCTIC AND SUBARCTIC 1960-61, 1961-62.
Special rept.
by Michael Bilello. Feb 64, 117p
CRREL SR43, P2

Unclassified report

Report on Cold Regions Environmental Studies.

Descriptors: (*Ice, Thickness), (*Arctic regions, Ice), North America, Environmental tests, Cold weather tests, Alaska, Canada, Greenland, Sea water, Meteorology.

between two drill holes. Propagation of signals were attributed to the path through the rock as opposed to that through the air. The average attenuation and phase constants of the rock medium along the path were obtained from the measured mutual impedances between antennas placed in the two holes. The bulk conductivity between the holes was deduced from these measurements. In the New York tests, the conductivity appeared to be about one order of magnitude less than that deduced for Cape Cod, (AD-407 840, AD-430 719) with consequent decreased exponential damping loss for a given frequency or higher frequency for the same loss. (Author)

AD-600 786 Div. 2, 25
OTS Price $1.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
GEODIMETER SVV-1 AND THE RESULTS OF ITS PROVING TESTS.
by V. A. Velichko. 28 Apr 64, 35p
FTD TT63 1154, TT 64 11735
Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geodeziya i Aerofotos'emka (USSR) 1957, no. 2, p. 37-54.

Descriptors: (*Optical instruments, Geodesics), (*Geodesics, Optical instruments), Distance-measuring equipment, Optics, Radar, Operation, Design, Tests, USSR.

The described geodimeter differs in comparison with other geodimeters by: (1) a demodulating Kerr cell in the receiving tube, (2) a smooth variation of frequency range, and (3) a jumplike phase shift of light modulation through 180 degrees. The geodimeter has the following parts: (1) a transponder with optical tubes and an alternating and direct polarizing voltage generator; (2) a power pack for the geodimeter; (3) batteries and a field electric power station for their charging; (4) a frequency meter for the determination of frequencies during observations; (5) a standard-frequency receiver; and (6) a parasitic reflector. The device may be set up on a stand or a small geodesic signal table..

AD-600 800 Div. 2, 30
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
CURRENT STATE OF FOREIGN OPTICAL DISTANCE-FINDER TECHNOLOGY.
by V. P. Vasil'ev. 27 Apr 64, 15p
FTD TT64 182, TT 64 11658
Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geodeziya i Aerofotos'emka (USSR) 1957, no. 2, p. 73-81.

Descriptors: (*Distance-measuring equipment, Range finding), (*Optical equipment, Range finding), (*Range finding, Distance-measuring equipment), Kerr cells, USSR, Geodesics.

AD-600 801 Div. 2, 25
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THEORY OF REGULATABLE DIRECTIONAL RECEPTION (RNP).
by S. A. Nakhamkin. 29 Apr 64, 10p
FTD TT64 197 TT 64 11659
Unclassified report

Unedited rough draft trans. of Voprosy Dinamicheskoi Teorii Rasprostraneniya Seismicheskikh Voln (USSR) 1962, no. 6, p. 181-184.

Descriptors: (*Seismology, Wave transmission), (*Direction finding, Seismic waves), Frequency, Velocity, Equations, Mathematical analysis, Theory, USSR, Geophysics.

The theory of the regulatable directional (RNP) method, which was developed at the seismic laboratory of MINKh, was further developed on the base of the frequency theory of signals. As a result it is possible to synthesize RNP systems by determining in the best way the necessary parameters. Formulas are derived for the resolution of the RNP Method. The absence of interference of the amplitude increments, in the form of which waves are recorded on the summing tape, is a necessary condition for complete resolution of two waves by the RNP method. Here interpolation of summarized recordings by their amplitudes in the interval between the positions of cophase summation of superposed waves must ensure that at least one summarized recording with zero amplitude increments for both waves can be obtained.

AD-600 819 Div. 2
OTS Price $1.50

Atmospheric Research and Development Corp., Kansas City, Mo.
TROPOPAUSE PENETRATIONS BY CUMULONIMBUS CLOUDS.
Scientific rept. 1
by Howard H. Hanks, Jr., Michael J. Long, and R. G. Beebe.
Feb 64, 54p
Contract AF19 628 2454, Proj. 8624, Task 862402
AFCRL 64 111
Unclassified report

Descriptors: (*Cumulonimbus clouds, Tropopause), (*Tropopause, Cumulonimbus clouds), Climatology, Atmosphere, Thunderstorms, Penetration, Meteorology.

This report presents a 2 1/2 year climatology of penetrations of the tropopause at 9 stations in the United States. WSR-57 radar data for 1961-1963 are summarized by geographical area, by months, and on a diurnal basis. The main summary is for penetrations greater than 5,000 and 10,000 feet. Conclusions are that penetrations of the tropopause occur (1) near the time of maximum thunderstorm activity, (2) mostly in the summer, (3) in the areas of greatest severe thunderstorm activity; (4) there was no simple relationship found between tropopause penetrations and the number of thunderstorms; and (5) there was no useful relationship found between tropopause height and the extent of the tropopause penetrations. (Author)

AD-600 828 Div. 2, 30
OTS Price $2.50

Gulf Coast Research Lab., Ocean Springs, Miss.
SURFACE CIRCULATION IN NORTHEASTERN GULF OF MEXICO.
Technical rept. no. 1, Sep 60-Oct 62
by Kirby L. Drennan. 1 Dec 63, 116p
Contracts Nonr3198 00 and Nonr3198 01, Proj. NR083 148.
Unclassified report

Descriptors: (*Ocean currents, Mexico gulf), (*Mexico gulf, Ocean currents), (*Oceanology, Mexico gulf), Wind, Rivers, Temperature, Salinity, Oceans, Surface properties, Oceanographic equipment, Oceanographic data, Maps.

The general features of the surface circulation in the northeastern Gulf are presented from an analysis of surface density distribution and an extensive drift bottle study. Results of drift bottle study are based on 6,400 recoveries. Twenty cruises were conducted in the regions east and south of the Mississippi Delta, during the period September 1960-October 1962. Data obtained at this time indicate a surface flow of approximately 0.7 kt. to the east and northeast during March-June. Hydraulic heads formed by discharge from eastern Passes extend some 70-90 miles seaward. Convergence lines associated with strong density gradients are commonly found along southern boundary of these areas. Surface circulation for the area is depicted as follows: An eastward flow during spring and early summer, which diverges into northeast and southeast flow at varing distances east of the Delta depending on local winds and river discharge; a southwest flow over continental shelf during late summer and fall, which appears to continue westward and into southwestern Gulf. The existence of the southeast flowing loop

AD-600 664 Div. 2
OTS Price $3.50

McGill Univ., Montreal (Quebec).
CONTRIBUTIONS TO THE SEMINARS ON THE STRATOSPHERE AND MESOSPHERE AND POLAR METEOROLOGY JULY 7-9, 1963 AT STANSTEAD COLLEGE, STANSTEAD, QUEBEC PROVIDENCE, CANADA.
Scientific rept. no. 9
by F. K. Hare. Jan 63, 242p AMRG PM65
Contract AF19 604 8431, Proj. 8628, Task 862807
AFCRL 64 197

Unclassified report

Descriptors: (*Symposia, Atmosphere), (*Atmosphere, Symposia), (*Meteorology, Polar regions), Upper atmosphere, Stratosphere, Meteorological parameters, Climatology, Geophysics, Canada, Data processing systems.

This report contains extended summaries of all the lectures presented at the meetings held at Stanstead in July 1963. Some summarize work already in print, and many contain material which has not yet been published. The summaries range over a wide variety of topics including polar micro-climatology, automatic data processing and computer applications to numerical weather prediction, atmospheric ozone, problems of atmospheric dynamics and energy and momentum studies, and atmospheric tides and gravity waves. (Author)

AD-600 670 Div. 2
OTS Price $0.75

Institute of Geodesy, Photogrammetry and Cartography, Ohio State Univ. Research Foundation, Columbus.
DEFLECTIONS OF THE VERTICAL CAUSED BY TOPOGRAPHIC MASSES IN THE NEAREST NEIGHBORHOOD OF THE POINT.
Scientific rept. no. 6
by G. L. Strang van Hees. Mar 64, 21p
IGPC39, OSURF1613 6
Contract AF19 628 2771, Proj. 7600, Task 760002
AFCRL 64 320

Unclassified report

Descriptors: (*Geodesics, Surveying), Terrain, Deflection, Gravity, Geophysics.

As known, the deflections of the vertical can be computed by the formulas of Vening Meinesz. Although one has to know the gravity over the whole earth, the influence of the nearest neighborhood of the computation point is the greatest. So, it is very important that a dense gravity survey be carried out around the point. However, this is not always possible, especially in mountainous areas. In that case, it is best to compute the influence of the nearest neighborhood from the topography. In this paper is investigated the order of magnitude of the influence of nearby topography on the deflections of the vertical. The influence is computed for several points for an area with a radius of about 5 km around the point. This shows that the influence of the nearest neighborhood can reach considerable amounts and may never be neglected in mountainous areas. Further formulas are derived for the influence of the central zone on the deflections, assuming that the point lies on a slope. In the last chapter some models are studied in order to get a more general insight about the deflections caused by topography. (Author)

AD-600 671 Div. 2
OTS Price $1.25

Institute of Geodesy, Photogrammetry and Cartography, Ohio State Univ. Research Foundation, Columbus.
ON THE ACCURACY OF GEOID HEIGHTS AND DEFLECTIONS OF THE VERTICAL.
Scientific rept. no. 5
by E. Groten and H. Moritz. Mar 64, 42p
IGPC38, OSURF1613 5
Contract AF19 628 2771, Proj. 7600, Task 760002
AFCRL 64 319

Unclassified report

Descriptors: (*Geodesics, Gravity), (*Gravity, Measurement), Geophysics, Earth, Geometric forms, Deflection, Special functions.

The accuracy of the geoid undulations and the deflections of the vertical, obtainable by means of different idealized gravity nets, is investigated. The following cases are assumed: one gravity station or one gravity profile in every 1 degree x 1 degree, 2 degrees x 2 degrees, 5 degrees x 5 degrees, and 10 degrees x 10 degrees blocks. (Author)

AD-600 693 Div. 2
OTS Price $0.50

RAND Corp., Santa Monica, Calif.
COMPLETE SCATTERING PARAMETERS OF POLY-DISPERSED HYDROMETERS IN THE WAVELENGTH 0.1 TO WAVELENGTH 10cm RANGE.
by D. Deirmendjian. May 64, 14p P2914,

Unclassified report

Descriptors: (*Scattering, Clouds), (*Microwaves, Scattering) Attenuation, Clouds, Atmospheric precipitation, Raindrops, Hydrometers.

A theoretical investigation to introduce a realistic size spectrum for the precipitation drops, including those found near the base of a cloud, and to evaluate as exactly as possible all the rational scattering parameters that are necessary inputs for the formulation of the equivalent radiative transfer problem; in addition to the scattering and absorption coefficients, these parameters include polarization at any scattering angle, per unit volume of space with precipitation and/or cloud particles. (Author)

AD-600 712 Div. 2
OTS Price $10.10

Indiana Univ., Bloomington.
VISIBILITY CONDITIONS IN MALAYA.
Final rept.
by Don C. Bennett and Richard D. Smith. 25 Mar 63, 122p
Contract DA19 129qm1582, Proj. 7 83 01 006,

Unclassified report

Descriptors: (*Visibility, Malaya), (*Malaya, Visibility), (*Atmosphere, Optical properties), Climatology, Meteorology, Geography.

Examination of visibility conditions in Malaya, including an analysis of frequency of visibility for distance categories by month and day. Regional pattern established. Factors inhibiting visibility in Malaya examined. (Author)

AD-600 758 Div. 2, 25
OTS Price $1.50

Raytheon Co., Norwood, Mass.
INVESTIGATIONS OF ELECTRICAL CHARACTERISTICS OF ROCK MEDIUM IN NORTHERN NEW YORK STATE.
Scientific rept. no. 3,
by Carson K. H. Tsao. Jan 64, 55p
Contract AF19 628 2362, Proj. 4600, Task 460008
AFCRL 64 99

Unclassified report

Descriptors: (*Geophysics, New York), (*New York, Geophysics), (*Lithosphere, Electrical properties), Well logging, Rock (Geology), Electrical conductance, Measurement, Antennas, Electromagnetic waves, Propagation.

Measurements were made in drill holes located in several areas in northeastern New York State to determine the conductivity of the rock media surrounding the drill holes. Conductivities in the drill holes were deduced from the quarter-wave resonance frequencies of insulated monopole antennas. Conductivity profiles in the holes were obtained from the input conductances of electrically short bare dipoles. At Mineville, New York, transmission tests over a 1-mile path were made

4. CHEMISTRY

AD-600 063 Div. 4, 14
OTS Price $1.00

Notre Dame Univ., Ind.
SYNTHESIS AND EVALUATION OF POLYMERS WITH SPECIAL PROPERTIES.
Summary rept.
by G. F. D'Alelio, R. C. Evers, T. Dehner, and T. Hoffend.
13 Mar 64, 35p
Contract DA11 022AMC169A

Unclassified report

Descriptors: (*Polymers, Synthesis (Chemistry)), (*Acrylic resins, Synthesis (Chemistry)), (*Alkynes, Polymers), Polymerization, Bromides, Organoboranes, Adhesives, Fuels, Neutron absorbers.

The previously unknown monomeric 1-acryloxy-2-butyne and 1-methacryloxy-2-butyne were synthesized. Other potential monomers of related structure, propargyl acetate, propargyl acrylate, propargyl methacrylate, 1-acryloxy-3butyne, 2-acryloxy-3butyne, and 1-diethylamino-4-acryloxy-2-butyne, were also prepared. The monomers 1-acryloxy-2-butyne and 1-methacryloxy-2-butyne were shown to form crosslinked polymers with radical and cationic initiators. Linear, uncrosslinked polymers were prepared from these two monomers with anionic initiators such as sodium and butyl lithium. These linear polymers were shown to contain free acetylenic groups which could undergo post reactions (1) with bromine to give a dibromide derivative, (2) with decaborane to give a carborane, and (3) to undergo crosslinking as a post reaction. In contrast, the butyne monomers which contained a terminal acetylenic hydrogen were found to products of undetermined structure. The thermal and radical-crosslinking of the linear polymers indicate their potential use as thermosetting adhesives while the post-brominated polymers may be useful for their self-extinguishing properties. The polymeric carboranes may find utility as fuels and as neutron-capture media. (Author)

AD-600 071 Div. 4, 25
OTS Price $1.00

Theoretical Chemistry Inst., Univ. of Wisconsin, Madison.
QUANTUM CORRECTIONS TO THE TRANSPORT CROSS-SECTIONS.
by Herbert T. Wood and C. F. Curtiss. 26 Mar 64, 32p
WIS TCI34A

Unclassified report

Descriptors: (*Quantum mechanics, Kinetic theory), (*Molecular properties, Transport properties), Particles, Perturbation theory, Phase shifts, Series, Differential equations, Integral equations.

By a method developed earlier, the second quantum correction to the phase shift in a collision between particles with spherically symmetric potentials is obtained. This expression, along with the classical limit and the first quantum correction developed earlier, is used to obtain the classical limit and the first and second quantum corrections to the cross-sections Q(1) and Q(2). In these expressions the potential function is not restricted to monotonic functions; the results apply to a potential with an attractive minimum. (Author)

AD-600 072 Div. 4, 25
OTS Price $0.50

Theoretical Chemistry Inst., Univ. of Wisconsin, Madison.
STATISTICAL MECHANICS AND IRREVERSIBILITY.
by Frank C. Andrews. 20 Feb 64, 20p, WIS TCI38
Grant NSF-G20725

Unclassified report

Descriptors: (*Statistical mechanics, Irreversible processes), (*Irreversible processes, Statistical mechanics), (*Thermodynamics, Statistical mechanics), Molecules, Kinetic theory, Entropy, Quantum statistics, Statistical functions, Integral equations, Probability.

The problem of obtaining irreversible evolution equations in statistical mechanics from reversible equations of motion is discussed. The sense in which mechanics gives rise to irreversibility is considered to rest on a clear understanding of the problem statistical mechanics attempts to solve. A discussion of the mechanical view of the second law of thermodynamics is also given. (Author)

AD-600 073 Div. 4, 25
OTS Price $0.50

Theoretical Chemistry Inst., Univ. of Wisconsin, Madison.
NOTE ON A PAPER BY SLIEPCEVICH AND FINN.
by Frank C. Andrews. 15 Apr 64, 10p, WIS TCI42
Grant NSF-G20725

Unclassified report

Descriptors: (*Thermodynamics, Equations of state), (*Irreversible processes, Thermodynamics), Entropy, Functions, Equations, Reviews.

A recent paper by Sliepcevich and Finn (Ind. Eng. Chem. Fund. Quart. 2:249, 1963) claims to derive the basic equations of irreversible thermodynamics, in particular the reciprocal relations, from fundamental macroscopic principles. This paper is analyzed and shown to contain simply a truism. (Author)

AD-600 080 Div. 4, 25
OTS Price $3.00

Massachusetts Inst. of Tech., Cambridge.
SEMICONDUCTOR CATALYSIS: SIMULTANEOUS MEASUREMENT OF KINETICS AND SURFACE ELECTRICAL PROPERTIES.
Technical rept. no. 1
by Robert P. Merrill and Raymond F. Baddour. 15 May 64, 163p
Contract Nonr3963 04, Proj. NRO51 448

Unclassified report

Descriptors: (*Catalysis, Semiconductors), (*Semiconductors, Catalysis), Ethanols, Germanium, Surface properties, Electrical properties, Recombination reactions, Decomposition, Reaction kinetics.

Theoretically and experimentally the relationship between the surface electrical properties of a semiconductor catalyst and its catalytic activity was explored. A program was proposed for the measurement of surface conductivity and recombination velocity on germanium simultaneously with the measurement of reaction kinetics of the decomposition of ethanol. The equipment to carry out these measurements included a system to operate a unique radio-frequency mass spectrometer, which was used to analyze the decomposition products. Key experiments to demonstrate the facility of the design, including measurements of ethanol decomposition on vacuum cleaved germanium and surface electrical properties of etched germanium wafers were made. In the kinetic experiments it was found that the catalysts produced by vacuum cleavage are much more active than catalysts produced by crushing in air and subsequent reduction in hydrogen, though the activation energies are similar. Treating the vacuum crushed catalyst with hydrogen lowers both the activation energy and the rate. Evidence is presented for the possible formation of a germanium hydride on the clean surfaces and the formation of an oxy-hydrogen complex on air-crushed catalysts.

current also is indicated in the offshore region southeast of the Delta at this time. Flow during winter months is to the southeast and appears to be a result of the northward migration of the loop current. (Author)

AD-600 835 Div. 2, 15, 30
OTS Price $0.75

Michigan State Univ., East Lansing.
A SIMPLIFIED MODEL FOR THE FORMATION, MOVEMENT, AND DISSIPATION OF FAIR WEATHER CUMULUS CLOUDS.
Scientific rept. no. 1
by Martin Fox. 29 May 64, 22pMSU RM113
Contract AF19 628 355, Proj. 8624, Task 862402
AFCRL 64 318

Unclassified report

Descriptors: (*Mathematical models, Cumulus clouds), (*Cumulus clouds, Mathematical models), (*Meteorological parameters, Mathematical models), Cloud cover, Stochastic processes, Differential equations, Probability.

A stochastic model for the temporal evolution of the contribution to cloud cover by fair weather cumuli is presented. A differential equation is obtained for a probability generating function. The general solution of the differential equation is obtained and this is used to obtain the probability generating function for the number of clouds at time t given the number at time O. It is noted that the real interest is in the joint probability generating function for the numbers of clouds at times t sub 1,...,t sub n given that at time O there are no clouds. The methods of obtaining this joint probability generating function is exemplified by the solution for the case n=2. A Mathematical Appendix at the end of this report carries out certain of the derivations in greater detail. The definition and some properties of probability generating functions are also included there.

AD-600 836 Div. 2, 30
OTS Price $2.25

Technical Operations, Inc., Burlington, Mass.
PROTOTYPE DEVELOPMENT FOR METEOROLOGICAL INSTRUMENTS.
Final rept.
by Calvin Y. Sing, Brian J. Thompson and Anthony F. Souza.
13 Jan 64, 83p TO B63 99
Contract AF 19 604 6661, Proj. 7605, Task 760501
AFCRL 64 92

Unclassified report

Descriptors: (*Meteorological instruments, Design), Meteorological parameters, Measurement, Raindrops, Spectrum analyzers, Hygrometers, Lasers, Feasibility studies.

Three types of instruments have been designed, fabricated, and tested for measuring various meteorological parameters: 1. A raindrop spectrometer using the principle of right-angle scattering of light is capable of resolving raindrops 0.2 mm to 5 mm diameter to within a precision of ± 10% while maintaining a counting rate of at least 100 drops per second. It has been designed to fit within the envelope of an external wing tank for the C-130 type aircraft. 2. A liquid-water-content meter that uses a capillary collector head for collecting the water was completely automated for unattended operation in the field. This instrument was fully tested at the AFCRL Fog Field Site at Otis Air Force Base, Massachusetts, during the period from July through September of 1963. 3. A droplet disdrometer utilizing the coherent light available from an optical maser (laser) to illuminate the water droplets in fog was developed to determine the size and distribution of the particles. The light illuminating these droplets was diffracted into rings, which were photographed. The size and distribution of the droplets were then determined from these ring patterns on the film. This instrument was also tested at the AFCRL field site. (Author)

AD-600 878 Div. 2
OTS Price $0.50

Lunar and Planetary Lab., Univ. of Arizona, Tucson.
INVESTIGATION OF O AND B SPECTRA OF STARS.
by B. M. Middlehurst. 1 Jun 64, 4p
Gran. Nonr(G)00029 64, Proj. NR046 803

Unclassified report

Descriptors: (*Stars, Spectroscopy), (*Astrophysics, Stars), Optical properties, Astronomy.

3. CHEMICAL WARFARE EQUIPMENT AND MATERIALS

AD-600 061 Div. 3, 4
OTS Price $1.75

Melpar, Inc., Falls Church, Va.
STUDY OF CHEMICAL AGENT DECONTAMINATION SYSTEMS FOR MULTIPURPOSE USE.
Bimonthly progress rept. no. 5, 17 Feb-20 Apr 64
by Z. Oser, S. Preis, F. A. Serafin, J. L. Poling, and H. E. Podall. May 64, 64p
Contract DA18 108AMC203A

Unclassified report

Descriptors: (*Chemical warfare agents, Oxidation), (*Chemical warfare agents, Decontamination), (*G agents, Oxidation), Reaction kinetics, Antioxidants, Catalysts, Carbon tetrachloride, Phenyl radicals, Iron compounds, Benzoates, Organic phosphorus compounds, Benzaldehydes, Nitriles, Alkenes, N-heterocyclic compounds, Phthalocyanines.

Competitive hydrogen transfer studies were conducted for methyl benzoate, diisopropyl methyl phosphonate (DIMP), GB, GF and HD vs. carbon tetrachloride in each case employing phenylazotriphenylmethane (PAT) as a source of phenyl radicals. The cooxidation of GB with benzaldehyde, and of GF with 2, 2-azobis (isobutyronitrile) (AIBN), indene, and with cyclooctene was investigated at 25 C. The kinetics of the autoxidation of GF in the presence of Co(II) catalyst at 75 to 135 C were investigated. In addition, the autoxidation reaction was investigated in the absence of catalyst and in the presence of varying quantities of catalyst. The effect of 2,6-di-tert-butylphenol (DTBP) as an inhibitor was investigated. The autoxidation of HD in the absence and in the presence of Co(II) catalyst at 105 C was examined. The use of ferrous phthalocyanine as a heterogeneous catalyst for the autoxidation of GF at 25 C was examined. The results obtained are compared with those reported for the autoxidation of carboxylic esters. (Author)

Trans. of Gazzetta Chimica Italiana, 1951, v. 81, p. 106-116.

Descriptors: (*Acetones, Condensation reactions), (*Furans, Condensation reactions), Organic nitrogen compounds, N-heterocyclic compounds, Molecular structure, Inorganic acids, Amines, Italy.

A study was undertaken of the behavior of isonitrosoacetone toward hydroxylamine in alkaline or acid media with the aim of contributing to the knowledge of the structure of condensation products obtained from isonitroso ketones when exposed to the effect of mineral acids or hydroxylamine hydrochloride. The results obtained by subjecting isonitrosoacetone to the action of hydroxylamine in a strongly alkaline medium, and to the action of hydrochloric acid are given. It was shown that the isonitroso compound is converted in the first case into amino-methylfurazan in an excellent yield, and in the second case into a condensation product whose structure is under investigation and whose brutto formula is C6H9N3O3. (Author)

AD-600 218 Div. 4, 16, 25
OTS Price $7.60

Space Technology Labs., Inc., Redondo Beach, Calif.
RESEARCH ON TRIPLET STATES AND PHOTOCHROMISM.
Annual research rept. no. 2, 1 Dec 61-31 Dec 62.
31 Dec 62, 73p STL8645.6005RU000
Contract AF41 609 1457, Proj. 7753, Task 27612
Unclassified report

Descriptors: (*Photochromism, Aromatic compounds), (*Flashblindness, Optical filters), (*Optical filters, Photochromism), Retina, Nuclear explosion damage, Hydrocarbons, Polycyclic compounds, Phosphorescence, Absorption spectrum, Deuterated compounds, Plastics, Optical properties.

The report describes research studies on the photochromic properties of the triplet states of aromatic compounds and their application to the problem of eye-protection against nuclear weapons. A flash photolysis apparatus with spectrographic recording was assembled and used to study a series o f 26 aromatic hydrocarbons. Triplet-triplet absorption spectra were found for 25 of the compounds. Techniques were developed for incorporating triplet compounds into plastic media. Apparatus for automatic spectrophotometric recording of T-T absorption in irradiated plastic specimens and for studying quantum yields and phosphorescence lifetimes were built. Theoretical studies were carried out on the possibility of increasing the quantum yield of triplet formation and the intensity of T-T absorption by chemical substitution. A theoretical evaluation was made of a model triplet state filter as an eye-protective device.

AD-600 223 Div. 4
OTS Price $1.60

Wisconsin Univ., Madison.
ADDITION AND DISPLACEMENT REACTIONS WITH UNSATURATED HYDROCARBONS.
Rept. for 1 Sep 62-31 Aug 63
by Harlan L. Goering. 14 Apr 64, 20p
Grant AF AFOSR47-63
AFOSR 64-0931
Unclassified report

Descriptors: (*Benzoates, Stereochemistry), (*Benzoates, Chemical reactions), (*Stereochemistry, Benzoates), Hydrocarbons, Molecular isomerism, Molecular rotation, Copper compounds, Bromides, Nitrobenzenes, Ionization, Acetones.

The cuprous-bromide-catalyzed reaction of t-butyl perbenzoate and bicyclo-(3.2.1)-octene-2 (I) results in the formation of exo(axial) -bicyclo-(3.2.1)-oct-3-en-2-yl benzoate (IIIa) which contains < 1% of the endo isomer. Optically active I gives racemic IIIa which means that the allylic carbon atoms (C2 and C4) are completely randomized. These results are consistent with the Kochi mechanism; i.e., abstraction of an allylic hydrogen atom to give the symmetrical bicyclo(3.2.1)-oct-3en2-yl radical (II) which is stereoselectively converted to racemic exo benzoate (IIIa). (Progress is also reported of studies concerning the solvolysis of alpha-p-anisylethyl p-nitrobenzoate (ROCOC6H4NO2) under various conditions.) (Author)

AD-600 255 Div. 4, 16
OTS Price $1.00

Uppsala Univ. (Sweden).
SPECTRAL STUDIES OF THE PHOTOBLEACHING OF RIBOFLAVIN PHOSPHATE.
Special technical and scientific rept. no. 2.
by Bertil Holmstrom. Apr 64, 35p
Contract DA91 591EUC2828; Proj. OI360461B
Unclassified report

Report on Flash Photolysis Study of the Reactions Between Photoexcited Fluorescein (and Similar Dyes) and Selected Substrates Which Are on the One Hand Electron Donors and on the Other Hand Electron Acceptors.

Descriptors: (*Photochemistry, Vitamin B complex), (*Vitamin B complex, Photochemistry), (*Anthoxanthin pigments, Photochemistry), Organic pigments, Phosphates, Reduction (Chemistry), Oxygen, Hydrogen peroxide, Ethylendinitrilo tetracetates, Spectroscopy.

The spectral changes during photobleaching of riboflavin phosphate (Rf) in neutral solution was studied, both in oxygen free solutions, in presence of small amounts of oxygen, in air saturated solutions, and in presence of hydrogen peroxide. After anaerobic photolysis, aeration, and extraction of lumichrome (Lc) the solution contains an alkali sensitive and extremely light sensitive compound, deuteroflavin (Df). It was proved that these properties can not be due to hydrogen peroxide. The destruction of Rf takes place during the illumination and not during the aeration. After an initial build-up period, the anaerobic photolysis is a steady state process with regard to leuco-deuteroflavin (H sub 2 Df). Small amounts of oxygen increase the yield of Lc and decrease the concentration of H sub 2 Df. Aerobic photolysis leads to Lc and a compound with an absorption macimum at 400 millimicrons. Similar results are obtained in presence of H sub 2 O sub 2. Previous observations regarding the decrease in the quantum yield during the course of the anaerobic photobleaching, and the buffer effect, are confirmed, although not quantitatively. The results are compared with those from experiments with 10 mM EDTA.

AD-600 334 Div. 4, 14
OTS Price $1.60

General Technologies Corp., Alexandria, Va.
A STUDY OF HIGH MODULUS, HIGH STRENGTH FILAMENT MATERIALS BY DEPOSITION TECHNIQUES.
Bi-monthly progress rept. no. 3, 1 Mar-30 Apr 64.
by L. G. Davies and J. C. Withers 15 May 64, 13p
Contract NOw64 0176c
Unclassified report

Descriptors: (*Filaments, Synthesis (Chemistry)), Composite materials, Silicon compounds, Carbides, Boron compounds, Aluminum compounds, Oxides, Titanium compounds, Silanes, Vapor plating, Tensile properties, Metallography, Crystal structure, Density.

Two vapor deposition techniques were tried for the deposition of aluminum oxide filaments. Neither technique produced satisfactory deposits. Silicon carbide filaments were deposited from trichlorosilane and trichloromethylsilane. An x-ray analysis of silicon carbide and boron carbide was also completed. The presence of SiC and B4C was not shown conclusively. Metallographic examinations were made on all filament materials. The titanium compounds showed a crystalline structure while no crystal structure was evident on the other materials. (Author)

AD-600 085 Div. 4, 14
OTS Price $0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
STUDIES IN THE FIELD OF COORDINATION CHAIN POLYMERS VII. COORDINATION POLYMERS BASED ON QUINIZARIN AND 4, 4'-BIS-(ACETOACETYL)-DIPHENYL ETHER.
by V. V. Korshak, S. V. Vinogradova, and D. T. Morozova.
22 Apr 64, 15p
RSIC 168; TT 64-11643

Unclassified report

Trans. of Vysokomolekularnye Soedineniya (USSR) 1961, v. 3, no. 10, p. 1500-1508.

Descriptors: (*Metalorganic compounds, Polymers) (*Complex compounds, Polymers), Diphenyl, Ethers, Polycyclic compounds, Quinones, Alcholols, Zinc compounds, Copper compounds, Manganese compounds, Nickel compounds, Cobalt compounds, Magnesium compounds, Calcium compounds, Cadmium compounds, Beryllium compounds, Synthesis (Chemistry).

Polymetallic derivatives based on quinizarin or quinizarin and 4,4'-bis-(acetoacetyl)-phenyl ether and the following metals: zinc, copper, manganese, nickel, cobalt, magnesium, calcium, cadmium, and beryllium, were synthesized and investigated. (Author)

AD-600 114 Div. 4, 25
OTS Price $0.50

Theoretical Chemistry Inst., Univ. of Wisconsin, Madison.
UPPER AND LOWER BOUNDS FOR RAYLEIGH-SCHRODINGER PERTURBATION ENERGIES.
by Kenneth M. Sando and J. O. Hirschfelder. 26 Feb 64, 20p WIS TCI39
Contract AF33 657 7311, Grant NsG275 62

Unclassified report

Descriptors: (*Perturbation theory, Atomic energy levels), (*Quantum mechanics, Perturbation theory), Field theory, Special functions, Differential equations, Electrostatics.

Variational principles for upper and lower bounds to all even order Rayleigh-Schrodinger perturbation energies are given. The upper bound for the second order energy is just the Hylleraas principle and the upper bounds for energies through 12th order are the same as those used by Knight and Scherr. The general upper bound principle for the (2n)th order energy is equivalent to the variational principle obtained by Sinanoglu for the n-th order wave function, but our principle gives the exact (2n)th order energy when the trial wave function is exact. The lower bounds for the even order energies are generalizations of the lower bound obtained by Prager and Hirschfelder for the second order. (Author)

AD-600 153 Div. 4
OTS Price $1.50

Parametrics, Inc., Waltham, Mass.
DETECTION OF HYDROGEN ABOARD AEROSPACE FLIGHT VEHICLES.
Technical documentary rept. 1 Jan-31 Dec 63
by O. Cucchiara, T. Donaghue, and D. Chleck.
Apr 64, 57p
Contract AF33 657 8916, Proj. 6075, Task 607508
APL TDR64 51

Unclassified report

Descriptors: (*Hydrogen, Chemical analysis), (*Closed ecological systems, Hydrogen), Vapors, Aluminum compounds, Oxides, Dioxides, Platinum compounds, Krypton, Radioactive isotopes, Life support, Exchange reactions, Aerospace craft.

A detailed investigation to determine the applicability of radiochemical exchange techniques, using 'Kryptonates', as a system for detecting hydrogen vapor concentrations of 1% or less, aboard aerospace flight vehicles, was conducted. The optimum host material was found to be a 50-50 mixture of aluminum oxide and kryptonated platinum dioxide. This mixture can detect hydrogen in concentrations less than 1% with a response time of less than 0.5 seconds. An experimental model demonstrating the feasibility and applicability of the kryptonate detection system was constructed. (Author)

AD-600 165 Div. 4, 25
OTS Price $1.25

Uppsala Univ. (Sweden).
BASIC CONCEPTS IN THE ELECTRONIC SPECTRA OF POLYATOMIC MOLECULES.
Technical note no. 101
by Sadhan Basu. 1 Jun 63, 47p
Contract AF61 052 351
ARL 63 248

Unclassified report

Descriptors: (*Molecular spectroscopy, Polyatomic molecules), (*Polyatomic molecules, Molecular spectroscopy), (*Quantum mechanics, Molecular spectroscopy), Electrons, Emissivity, Spectra (Visible and ultraviolet), Absorption spectrum, Field theory, Electron transitions, Selection rules, Benzene, Molecular structure, Theory.

The theory of electronic spectra is reviewed. (Author)

AD-600 166 Div. 4, 25
OTS Price $0.75

Uppsala Univ. (Sweden).
THE DIRECT DETERMINATION OF NATURAL ORBITALS AND NATURAL EXPANSION COEFFICIENTS OF MANY ELECTRON WAVE FUNCTIONS. I. NATURAL ORBITALS IN THE GEMINAL PRODUCT APPROXIMATION.
Scientific rept. no. 7
by Werner Kutzelnigg. 1 Jan 64, 23p
Contract AF61 052 701
ARL 64 99

Unclassified report

Descriptors: (*Atomic orbitals, Field theory), (*Quantum mechanics, Atomic orbitals), Electrons, Special functions (Mathematical), Integral equations, Partial differential equations, Numerical analysis, Iterative methods.

The approximation of a many particle wave function as an antisymmetrized product of strongly orthogonal geminals (APSG) (geminal means two electron function) is analized in terms of its natural expansion. APSG wave functions have very simple and interesting properties. The 'generating spin geminals' (GSG) are automatically natural spin geminals (NSG) of the system with occupation number 1 (in the Lowdin normalization); 1 is the upper bound for the eigenvalues of the 2 particle density matrix for wave functions of this type. The natural spin orbitals 'NSO' of the GSG are automatically NSO of the total wave function and of all the NSG. A generalized 'paired orbital function' is defined in terms of its natural expansion. It contains the APSG type as well as the Bardeen-Cooper-Schrieffer (BCS)-functions as special cases. Integro-differential equations determining the NSO and their expansion coefficients for an APSG function are derived for the special case of a singlet state by minimizing the total electronic energy. An iterative resolution procedure is proposed. (Author)

AD-600 180 Div. 4
OTS Price $0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
STUDIES ON ISONITROSOKETONES.
by S. Cusmano and T. Tiberio. 22 Apr 64, 14p
RSIC 167, TT 64 11644

Unclassified report

theoretical considerations and practical demonstrations indicated that the effective temperature was invariably raised thereby. Methods evaluated included absorption by treated fibers and by chemical agents as well as drying by mechanically powered dehumidification devices.

AD-600 439 Div. 4
OTS Price $2.00

Brussels Free Univ. (Belgium).
THE CHLORINE PHOTOSENSITIZED OXIDATION OF HYDROCARBONS AT LOW TEMPERATURES.
Final technical rept., 1 Jan-31 Dec 63
by G. Martens, G. Huybrechts, L. Meyers and J. Olbregts.
Jan 64, 74p
ContractDA91 591EUC2776

Unclassified report

Descriptors: (*Alkanes, Oxidation), (*Chlorination, Photochemistry), Reaction kinetics, Low-temperature research.

The oxygen effect on the photochlorination of ethane was studied at 310 K. Due to the extremely long chain of the uninhibited reaction the effect is quite high and can be explained by the reaction of an ethyl chain carrier with the oxygen molecule. The rate constant of this step C2H5 + O2 (yields) C2H5O2 was measured. The rate dependence on concentrations and light intensity are discussed. The chlorine photosensitized oxidation of trichloroethylene and the competition chlorination-oxidation were studied. In the present stage only overall rate equations can be given which can be explained by different mechanisms. In mixtures of chlorine, oxygen and trichloroethylene an after effect appears when the actinic light is cut after a small illumination time. This dark reaction seems to consume only chlorine and trichloroethylene but the explanation of the phenomenon requires more experimental data. These will be obtained by mass-spectrometric measurements performed at the present time. (Author)

AD-600 442 Div. 4, 25
OTS Price $1.00

Brussels Univ., (Belgium).
VAPORIZATION OF COMPOUNDS AND ALLOYS AT HIGH TEMPERATURES. PART XXII. MASS SPECTROMETRIC DETERMINATION OF THE DISSOCIATION ENERGY OF THE MOLECULES MgO, CaO, SrO AND Sr2O.
by John Drowart, G. Exsteen and G. Verhaegen. Apr 64, 36p
Contract AF61 052 225, Proj. 7350, Task 735001
TR60 782 P22

Unclassified report

Report on Refractory Inorganic Non-Metallic Materials.

Descriptors: (*Oxides, Dissociation), (*Magnesium compounds, Oxides), (*Calcium compounds, Oxides), (*Strontium compounds, Oxides), Thermochemistry, Mass spectroscopy, Atomic energy levels, Molecular properties, Enthalpy, Atomization, Energy, Refractory materials, High-temperature research.

The dissociation energy of the molecules MgO, CaO, SrO was determined. The molecule Sr2O was identified and its atomization energy determined.

AD-600 464 Div. 4, 16
OTS Price $1.60

Vanderbilt Univ., Nashville, Tenn.
GLYCIDIC ESTERS AND/OR ORGANIC DISULFIDES, AND RELATED SUBSTANCES, AS SOURCES OF ANTI-RADIATION DRUGS.
Interim research rept. no. 17, 1 Oct-31 Dec 63.
by J.D. Buckman, H. K. Kim, W. B. Lacefield, T. F. Parsons and L. Field. 31 Dec 63, 14p
Contract DA49 193MD2030
NP 13730

Unclassified report

Descriptors: (*Radioprotective agents, Biological assay), (*Radioprotective agents, Chemical reactions), Drugs, Thiols, Sulfides, Sulfonates, Phenyl radicals, Benzoic acids, Sulfinic acids, Chemical analysis, Disproportionation, Reaction kinetics, Amines, Ethyl radicals, Propionic acid, Esters.

Nine compounds submitted for screening were tested. The reactions of ammonium dithiocarbamate with thiolsulfonates (RSO2SR') differed significantly from the reactions of the dimethyldithiocarbamate salts. The trisulfide R'SSSR' may be a product in at least one instance. Additional analogs of the radioprotective compound o-aminoethyldithiobenzoic acid were prepared and their disproportionation studied. Synthesis of mercaptodisulfides and related substances is being studied. A patented method for synthesizing dithiosulfites was confirmed, and an improved purification method developed. The mechanism of a thiolsulfonate synthesis utilizing a sulfinic acid, a thiol, and a nitrite ester is being studied. A hindered disulfide was oxidized to the corresponding thiol-sulfonate in good yield. Factors bearing on the disproportionation of mixed disulfides were evaluated using 2-aminoethyl phenyl disulfide hydrochloride as a model. Study of the disproportionation of five 2-aminoethyl p-substituted aryl disulfide hydrochlorides showed that in ease of disproportionation the following order held: NO2>Cl>H>CH3>OCH3.

AD-600 507 Div. 4
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
TEMPERATURE PROFILES UPON BURNING OF AMMONIUM PERCHLORATE.
by V. K. Bobolev and A. P. Glazkova. 11 May 64, 11p
FTD TT64 327 TT 64-11719

Unclassified report

Unedited rough draft trans. of A kademiya N auk SSSR. Doklady, 1963, v. 151, no. 3, p. 604-607.

Descriptors: (*Ammonium compounds, Burning rate), (*Perchlorates, Burning rate), Explosive materials, Thermocouples, Reaction kinetics, USSR.

The study of the principles of burning of ammonium perchlorate is of great interest owing to the anomalies which have been revealed by studies of the process. One of the authors experimentation showed the burning of perchlorate to be very sensitive to changes in experiment conditions, and in particular to the jacket - unjacketed specimens 7 mm in diameter at pressures exceeding 150 atm, in contrast to specimens with a 4 mm diameter. The dependence of the burning velocity on pressure has an unusual form: an increase in pressure above 150 atm entails a drop of burning velocity. Temperature profiles were obtained in the 40-350 atm pressure range. Anomalous dependences of surface temperature and heat release in the condensed phase of pressure were established.

AD-600 541 Div. 4, 25, 16
OTS Price $13.00

Weizmann Inst., Rehovot (Israel).
MECHANOCHEMISTRY OF COUPLED CONTRACTILE AND CHEMICAL RATE PROCESSES.
Final rept.
by A. Katchalsky. Jan 64, 188p
Grant AF EOAR 62 58
AFOSR 64 0993

Unclassified report

Descriptors: (*Chemical reactions, Energy), (*Energy, Chemical reactions), (*Energy conversion, Biophysics.) Mechanics, Molecules, Molecular properties, Fibers, Rubber, Polymers, Elasticity, Contraction, Fatigue (Physiology), Relaxation (Physiology), Machines, Collagen.

Division 4 - CHEMISTRY

AD-600 396 Div. 4
OTS Price $2.00

National Bureau of Standards, Washington, D. C.
HEATS OF FORMATION OF METALLIC BORIDES BY FLUORINE BOMB CALORIMETRY.
Technical documentary rept., 1 Oct 61-30 Sep 63
by Eugene S. Domalski and George T. Armstrong. Mar 64, 74p
Contract AF33 616 61 09, Proj. 3048, Task 304802
NBS 8153, APL TDR64 39

Unclassified report

Descriptors: (*Borides, Heat of formation), (*Metallic compounds, Heat of formation), Zirconium compounds, Aluminum compounds, Thermodynamics, Combustion, Fluorine, Calorimeters, Combustion products.

The heats of formation of AlB2 and AlB12 were calculated. Uncertainties of the heats of formation, estimated as the standard deviations of the means, are 2.1 and 1.8 kcal mole, respectively. The samples were completely analyzed and carefully characterized. Some combustion measurements on impure zirconium borides are reported. A review with 85 references is given of the available thermodynamic data on borides.

AD-600 423 Div. 4, 18
OTS Price $0.50

Florida Univ., Gainesville. Engineering Experiment Station.
MOISTURE IN SURVIVAL SHELTERS.
Summary of research rept.
27 Apr 64, 18p
Contract OCD OS62 51

Unclassified report

Descriptors: (*Moisture, Shelters), (*Shelters, Survival), Humidity, Condensation, Driers (Apparatus).

Research on the following problem areas is given: (1) A study of sources of moisture and condensate in occupied and unoccupied shelters including the effects of climate, ground water, permeability, ventilation, latent heat, dew point, and surface temperatures was made. (2) An investigation of promising methods for reducing humidity, preventing leakage of moisture into shelters and controlling moisture and condensate was conducted. (3) Commercial dehumidifying apparatus for use in survival shelters was evaluated. (4) Chemicals which might be suitable for the absorption of moisture and the control of shelter humidity were investigated. Comparative tests were performed on the basis of the information developed during the above evaluations. Conclusions were drawn and recommendations were made with respect to suitable apparatus and procedures necessary for control of humidity and moisture in survival shelters. (Author)

AD-600 428 Div. 4, 17
OTS Price $0.75

Tennessee Univ., Knoxville.
OXIDATION OF CESIUM AT LOW TEMPERATURES AND PRESSURES
by E. E. Stansbury and J. E. Epperson. May 64, 21p
Contract AF40 600 1023, Proj. 6950, Task 695003
AEDC tdr64 111

Unclassified report

Descriptors: (*Cesium, Oxidation), (*Oxidation, Reaction kinetics), Low-temperature research, Low-pressure research, Rocket propellants.

Research indicated that the oxidation of cesium is very rapid for oxygen pressures approaching 0.001 torr at 0 C but is very small at -78 C. At intermediate temperatures, the oxidation curves exhibit the break away phenomenon observed for other alkali metals in which an accelerating rate of oxidation is observed following an initial slow rate. (Author)

AD-600 431 Div. 4, 14
OTS Price $0.50

Frick Chemical Lab., Princeton Univ., N. J.
THE VISCOELASTIC PROPERTIES OF A ZINC PHOSPHINATE POLYMER.
ONR Technical rept.
by A. D. Mair, M. C. Shen, and A. V. Tobolsky. May 64, 18p
RLT77
Contract Nonr1858 07, Proj. NR356 377

Unclassified report

Descriptors: (*Zinc compounds, Viscoelasticity), (*Organic phosphorus compounds, Viscoelasticity), Inorganic polymers, Complex compounds, Metalorganic compounds, Molecular weight, Glass.

The viscoelastic behaviour of an inorganic glass, the co-ordination polymer Zn(OP(Ph)(Me)0)2, was investigated by a ball-indentation method. The polymer was found to exhibit the properties of a Maxwell body. The temperature dependence of the melt viscosity is of the Arrhenius form over the temperature range considered, giving an apparent activation energy of 74 kcal/mole for viscous flow, but does not agree with that predicted by the WLF equation in its usual form. From considerations of its intrinsic viscosity in benzene and its viscoelastic behaviour, it is concluded that the polymer is of low molecular weight.

AD-600 436 Div. 4
OTS Price $0.50

Glasgow Univ. (Scotland).
STRUCTURE OF AN ANOMALOUS HETEROCYCLIC INTERMEDIATE, BY X-RAY CRYSTAL ANALYSIS.
by J. Monteath Robertson. 1963 9p
Grant DA ER0591 3G0004

Unclassified report

Descriptors: (*S-heterocyclic compounds, Molecular structure), (*N-heterocyclic compounds, Molecular structure), Heterocyclic compounds, Chemical bonds, Atomic orbitals, Crystal structure, X-ray diffraction analysis.

An anomalous intermediate, C5H10N20S, was obtained during the preparation of the disulphide of 2-(2-mercaptoethylamino)-2-oxazoline. X-ray crystal-structure analysis established the intermediate as a substituted thiazoline, 2-(2-hydroxyethylamino)-2-thiazoline.

AD-600 437 Div. 4, 18
OTS Price $2.75

Florida Univ., Gainesville, Engineering and Industrial Experiment Station.
MOISTURE IN SURVIVAL SHELTERS.
Final rept.
by F. M. Flanigan and Juan O. Gonzalez, Jr. Apr 64 138p
Contract OCD OS62 51, Task 1213A

Unclassified report

Descriptors: (*Moisture, Shelters), (*Shelters, Survival Humidity, Condensation, Driers (Apparatus), Evaporation, Metabolism, Control.

An investigation was made into the sources of and the means of control of moisture in survival shelters. Moisture was found to originate within survival shelters as a result of the metabolic process of the occupants and by evaporation from exposed wetted surfaces. The principal modes for introduction of moisture were found to be gross leaks in the shelter structure, vapor migration through permeable walls and the humidity contribution of the ventilation air. Methods of moisture control included prevention of ingress by improved water and vapor proofing of the exterior shelter surfaces, removal by means of excess ventilation air, and condensation with or without subsequent rejection of the resultant latent heat. No satisfactory methods or devices were found for condensing or absorbing water vapor when the resultant latent heat was liberated within the space to be conditioned. Both

AD-600 818 Div. 4, 17
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A STUDY OF THE KINETICS OF THERMAL DECOMPOSITION OF SOLID CARBONYL COMPOUNDS OF METALS,
by O. D. Krichevskaya, N. A. Belozerskii, L. D. Segal', N. E. Kolobova and K. N. Anisimov. 28 Apr 64, 7p
FTD TT64 220, TT 64 11671

Unclassified report

Trans. of Zhurnal Neorganicheskoi Khimii (USSR) 1963, v. 8, no. 8, p. 1806-1808.

Descriptors: (*Molybdenum compounds, Pyrolysis), (*Manganese compounds, Pyrolysis), Metalorganic compounds, Carbonyl group, Reaction kinetics, Heat of activation, Manometers, Powder metallurgy, USSR.

The thermal decomposition reaction of solid molybdenum carbonyl and manganese cyclopentadienyltricarbonyl was studied on a special manometric apparatus. It was found that both reactions were of the first order. Constants of the reaction velocity and the activation energy were calculated. (Author)

AD-600 842 Div. 4, 25
OTS Price $1.00

Coates Chemical Lab., Louisiana State Univ., Baton Rouge.
THE INFLUENCE O SURFACE ROUGHNESS OF SOLID ELECTRODES ON ELECTROCHEMICAL MEASUREMENTS.
Technical rept. no. 54
by R. de Levie. May 64, 32p
Contract Nonr1575 04, Proj. NR051 258

Unclassified report

Descriptors: (*Electrochemistry, Electrodes), (*Electrodes, Surface properties), Chemical analysis, Mathematical models, Capacitance, Potentiometers.

The influence of surface roughness of solid electrodes on electrochemical measurements is critically examined. A model and its mathematical consequences are presented which describe the effects in at least a semiquantitative way. The conclusion is drawn that the neglect of surface roughness has led to apparent misinterpretations in literature, and that great caution should be exercised in this respect. (Author)

AD-600 851 Div. 4
OTS Price $0.50

Forest Products Lab., Madison, Wis.
TWO-STAGE NONCHLORINATION BLEACHING OF SECERAL HARDWOOD NEUTRAL SULFITE SEMICHEMICAL PULPS
Research note,
by F. A. Simmonds and Axel Hyttinen. Apr 64, 13p
FPL 043

Unclassified report

Descriptors: (*Bleaching agents, Hypochlorites), (*Wood pulp, Bleaching agents), (*Bleaching agents, Hydrogen peroxide), Sodium compounds, Chlorine compounds, Dioxides.

Several hardwood neutral sulfite semichemical pulps were bleached to about 85 percent brightness with a two-stage application of sodium hypochlorite, using a total chlorine equivalent of 12 to 25 percent, depending on the yield of the unbleached pulp. Brightness gains decreased with increasing brightness of unbleached pulp. Yields of bleached pulps were from 3 to 5 percent higher with two-stage bleaching than they were with three-stage chlorination hypochlorite bleaching. With this process, however, 88 percent brightness was obtained with equal or lesser amounts of chlorine equivalent. Except for the highest yield pulp, hydrogen peroxide was as effective as hypochlorite in the second stage, but chlorine dioxide was about 10 percent less effective. Effect on strength varied from negligible to increases as much as 80 percent for the average overall strength. (Author)

This work is based on the realization that efficient conversion of chemical into mechanical energy can be based on macromolecular systems of the type encountered in living mechanochemical systems, such as muscles, flagella or contractile membranes. First the general properties of swollen polymeric fibers or bands which retain their rigidity and useful elastic properties even at high degrees of swelling were studied. The behavior of cross-linked and swollen rubbers were studied in detail. The energetic parameters of interaction between the contractile gel and the added reagent were evaluated. It was found that some of the classical notions of rubber behavior could be applied to swollen rubbers. With a suitable extension of the theory of rubber elasticity, it was possible to account quantitatively for the elastic conversion points of swollen systems. It was found that very suitable mechanochemical engines could be prepared from partially cross-linked collagen fibers and strands. Under the action of strong solutions of lithium bromide or potassium thiocyanate collagen contracts quickly and reversibly and may perform cyclically without fatigue in numerous work cycles. This is the reason why most of this work is devoted to equilibrium and rate studies on collagen fibers. (Author)

AD-600 623 Div. 4
OTS Price $3.50

Air Force Office of Scientific Research, Washington, D. C.
CHEMISTRY PROGRAM REVIEW, FISCAL YEAR 1963.
ed. by Alfred Weissler, Milton D. Sprinkel, and Orville Rollins. 30 Dec 63, 216p
AFOSR 64 1003

Unclassified report

Descriptors: (*Chemistry, Reviews) Air Force Research, Reports, Bibliographies, Research program administration.

Contents: Aerospace chemistry by A. Weissler, New methods and techniques, by W. L. Ruigh, Inorganic chemistry, by D. W. Elliott, Chemical reactivity and mechanisms, by A. J. Matuszko, Symposia, by M. D. Sprinkel, Chemistry program statistics, by O. W. Rollins, Reports received in FY 63, by O. W. Rollins, Current chemistry program, Projects completed in FY 1963, Summaries of completed projects, Appendix: Chemistry as a profession.

AD-600 629 Div. 4, 9
OTS Price $4.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
A CRITIQUE ON REACTION RATE CONSTANTS INVOLVED IN THE CHEMICAL SYSTEM OF HIGH TEMPERATURE AIR.
Technical Information series,
by M. H. Bortner and J. A. Golden. Feb 61, 43p R61SD023, Contract DA36 034ORD3187

Unclassified report

Descriptors: (*Reaction kinetics, Air), (*Oxygen, Reaction kinetics), (*Nitrogen, Reaction kinetics), Nitrogen compounds, Oxides, Chemical reactions, High-temperature research, Reviews.

All available date on the rate constants for the reactions which occur in high temperature air were evaluated. Using each experimentally determined rate constant expression, over the temperature range covered in the study, a new expression which best fits all the data was developed. This was done for the following reactions O2 + M reversibly yields O + O + M, O + N2 reversibly yields N + NO, O + NO reversibly yields N + O2, N + O reversibly yields NO + + e, N2 + M reversibly yields N + N + M, NO + M reversibly yields N + O + M where the effect of various inert bodies (M's) is considered. The rate expressions found and the method by which they were determined are shown. Disagreements and inaccuracies are indicated. In addition, values of rate constants for a number of other reactions of less importance to these problems are indicated. (Author)

AD-600 788 Div. 4, 25
OTS Price $0.50

Foreign Tech., Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE VAPOR PRESSURE OF ZIRCONIUM TETRAFLUORIDE.
by P. A. akishin, V. I. Belousov, and L. N. sidorov.
28 Apr 64, 8p
FTD TT64 219, TT 64 11734

Unclassified report

Unedited rough draft trans. of Zhurnal Neorganicheskoi Khimii (USSR) 1963, v. 8, no. 6, p. 1520-1522.

Descriptors: (*Zirconium compounds, Vapor pressure), (*Zirconium compounds, Fluorides), Oxyfluorides, Ions, Mass spectroscopy, USSR.

AD-600 789 Div. 4, 14, 26
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
HYDROLYSIS OF ORGANOCHLOROSILANES IN A CONTINUOUS COUNTERFLOW SPRAY.
by T. G. Pavlenko and K. A. Andrianov. 29 Apr 64, 13p
FTD TT64 132

Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Khimiya i Khimicheskaya Tekhnologiya (USSR) 1963, v. 6, no. 3, p. 465-470.

Descriptors: (*Silanes, Hydrolysis), (*Silicone plastics, Production), Silicon compounds, Chlorides, Sprays, US3R.

The process of hydrolysis of certain organochlorosilanes was investigated and the possibility for carrying out hydrolysis in a continuous counterflow spray column was revealed. It was shown that the application of the continuous counterflow method led to the production of a polymer which was not qualitatively inferior to the one received by the discontinuous method in the mixing-type apparatus. The plastic prepared on the basis of the polymer showed good physicomechanical properties. (Author)

AD-600 815 Div. 4, 14
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A NEW METHOD FOR THE SYNTHESIS OF POLYPYRAZOLES,
by V. V. Korshak, E. S. Krongauss and A. M. Berlin.
29 Apr 64, 7p
FTD TT64 218, TT 64 11670

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, 1963, v. 152, no. 5, p. 1108-1110.

Descriptors: (*Heat-resistant plastics, Polyamide plastics), (*Polyamide plastics, Synthesis (Chemistry)), N-heterocyclic compounds, Polymerization, Spectra (Infrared), USSR.

A new method was worked out for the synthesis of polymers containing in the chains alternating pyrazole rings with a free NH-group of the pyrazole nucleus; the essence of this method is in the interaction of bisdiazo-compounds with n-diethynylbenzene or diacetylene. The synthesized polymers are yellow powders which are highly soluble in dimethylformamide and cresol, their reduced viscosity of a 0.5% solution in cresol is 0.2-0.3, and their molecular weight is approx. 10000. The polymer from 1,6-bisdiazohexane and n-diethynylbenzene has a melting point of 440 C (beginning at 416 C the polymer darkens); the polymer from bisdiazohexane and diacetylene melts in the range 350-374 C the polymer on a base of bisdiazoxylylene and diethynylbenzene does not melt til 500 C. (Author)

6. DETECTION

AD-600 240 Div. 6, 18, 30
OTS Price $5.00

Pennsylvania Research Associates, Inc., Philadelphia.
INVESTIGATION OF DIGITAL TECHNIQUES FOR RADAR LAND MASS SIMULATION.
Final technical rept. no. 3.
13 Mar 64, 330p
Contract N61339 1025
NAVTRADEVCEN, 1025 3

Unclassified report

Descriptors: (*Simulators, Radar signals), (*Radar scanning, Airborne), Radar equipment, Display systems, Surface targets, Digital systems, Design, Simulation, Real time, Mapping, Terrain, Analog-digital computers.

The report presents a logical design of a natural terrain radar land mass simulator, techniques for incorporating radar effects, and cultural terrain into the simulator, and relationship between simulator design and specific operational requirements. The results of this work indicate that the techniques developed are feasible from an engineering standpoint but are impractical due to cost considerations. A firmer understanding of the information content of maps and digital representation techniques must be established to compress the data to a degree whereby an economically feasible device can be developed. (Author)

AD-600 269 Div. 6, 8, 12
OTS Price $1.50

Oklahoma State Univ., Stillwater. Research Foundation.
SUPPORT OF THE UPPER AIR ROCKET RESEARCH PROGRAM.
Final rept.
by Claude M. Gwinn, Wayne Hoover, and Joe Zinn.
Jan 64, 59p
Contract AF19 604 6648; Proj. P7659; Task 765903
AFCRL 64 195

Unclassified report

Descriptors: (*Ground support equipment), (*Sounding rockets, Telemeter systems), (*Telemeter systems, Sounding rockets), Guided missiles, Upper atmosphere, Telemetering receivers, Telemetering transmitters, Portable, Ultrahigh frequency, Environmental tests, Calibration, Flight control systems, Timing devices, Rocket trajectories.

The components and assembly of compact portable FM/FM telemetry ground stations are described. The designs of both ground and airborne units associated with telemetry systems and the test and calibration of telemetry systems are presented. Some modifications made to commerically purchased items to extend their use for special applications are described. Systems for inflight control of events through timers and ground command are described. Some studies and experiments on utilizing the telemetry to obtain the trajectories of rockets are discussed. An investigation of the state of the art of UHF telemetry systems is discussed. (Author)

AD-600 272 Div. 6
OTS Price $2.75

Dayton Univ., Ohio. Research Inst.
COHERENT OPTICAL RADAR PARAMETERS AND TARGET REFLECTIONS.
Technical documentary rept. 1 July 62-30 Jun 63
by Werner R. Rambauske. Apr 64, 127p
Contract AF33 657 9014; Proj. 5191; Task 519102
RTD TDR63 4148

Unclassified report

Descriptors: (*Lasers, Radar), (*Light pulses, Reflection), (*Radar reflections, Lasers), Optical equipment components, Ruby, Radar targets, Geometric forms, Surfaces, Circuits, Signals, Interferometers.

The problem of the reflection of ruby laser pulses from artificial targets is investigated. The parameters of intensity distribution over the cross-section of a laser beam (in the 0.5 to 3 joule energy range) and the time history of this intensity within one pulse (in the 1/2 to 1 millisecond duration range) are measured and evaluated in different distances from the ruby rod up to 75 meters. Reflection characteristics for different standard geometrical bodies and different standard surface materials are derived experimentally and theoretically for incoherent white illumination and are compared with laser illumination. The change of time history of a single pulse after reflection from the target, due to the targets shape, is studied. This change when compared with the undistorted pulse from the rear of the ruby permits conclusions about the shape of the target. (Author)

AD-600 285 Div. 6, 2, 8, 12
OTS Price $1.50

Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
IONOSPHERIC CONTRIBUTIONS TO THE DOPPLER SHIFT AT VHF FROM NEAR-EARTH SATELLITES.
by W. H. Guier. July 63, 58p CM1040
Contract NOw62 0604c

Unclassified report

Descriptors: (*Satellites (Artificial), Tracking), (*Ionosphere, Doppler effect), (*Dopper effect, Very high frequency), Geodesics, Doppler systems, Atmospheric refraction, Electron density, Integral equations.

The ionospheric contributions to the non-relativistic Doppler shift at VHF from satellites above the ionosphere are considered to 0(1/f sub s to the 3rd power) where f sub s is the satellite transmitter frequency and the vacuum Doppler shift is considered of 0(f sub s). Boundary conditions are imposed on the solution to the wave equation containing the ionosphere electron contribution to the refractive index such that the solution to 0(1/f sub s to the 3rd power) in the phase is obtained. It is shown that to this order Fermat's principle can still be applied if the index of refraction is modified by terms containing gradients of the electron density. This generalized Fermat's principle is used to obtain the ionospheric contributions to the Doppler shift to 0(1/f sub s to the 3rd power) at VHF. Upper bounds for the various terms are estimated. It is shown that: (1) additional terms not given by the geometrical optics approximation are negligible so that geometrical optics theory is valid at VHF to 0(1/f sub s to the 3rd power), and (2) except for very disturbed conditions in the ionosphere, the use of the two frequency doppler data to eliminate the first order refraction contribution should yield negligible higher order refraction errors so long as the lower of the two frequencies in above 100 mc/s. (Author)

AD-600 377 Div. 6, 8
OTS Price $1.25

Naval Research Lab., Washington, D. C.
PERFORMANCE AND ANALYSIS OF SONAR TRANSMITTER USING PARALLEL INVERTER UNIT.
by F. L. Hunsicker. 8 Apr 64, 44p
NRL 6036

Unclassified report

Descriptors: (*Sonar projectors, Performance (Engineering)), (*Inverters, Sonar equipment), Silicon, Rectifiers, Inverter circuits, Transducers, Electrical properties, Design.

A solid-state sonar transmitter using silicon-controlled rectifiers in a parallel inverter circuit has been developed. The transmitter has an output power of three kilowatts, with an efficiency of 85 to 90 percent at low audio frequencies. An ac equivalent circuit for the parallel inverter and load combination has been analyzed to obtain equations for inverter

5. COMMUNICATIONS

AD-600 185 Div. 5, 8
OTS Price $0.75

Lincoln Lab., Mass. Inst. of Tech., Lexington.
SPECTRA OF VOCODER CHANNEL SIGNALS.
Group rept.
by C. M. Rader. 4 May 64, 21p LL1964-17
Contract AF19 628 500
ESD TDR64 58

Unclassified report

Descriptors: (*Speech compression, Voice communication systems), (*Voice communication systems), Speech recognition, Spectrum analyzers, Band-pass filters, Speech transmission.

A channel vocoder derives the short time magnitude spectrum of speech by passing the speech through a set of analyzing channels, each consisting of a band pass filter followed by an envelope detector and a low pass filter. Each channel produces a slowly varying output signal which represents a short term average of the speech energy in the corresponding frequency band. The measurement of the power spectra of these signals is described herein. It appears that these signals may be thought of as band limited to 25 cps. (Author)

AD-600 252 Div. 5, 8
OTS Price $5.00

Motorola, Inc., Chicago, Ill.
COMMUNICATION SYSTEM AN/USC-3(V).
Production program final rept., 26 Feb 62-1 Nov 63
by E. M. Beard, J. J. Krakora, J. Karas, A. T. Klingberg, and J. Fenner. 1 Nov 63, 396p
Contract DA36 039SC85302

Unclassified report

Descriptors: (*Communication systems, Effectiveness), (*Radio communication systems, Tests), (*Military communications, Specifications), Communication equipment, Design, Test sets, Test methods, Model tests, Facsimile communication systems, Radio teletype systems.

This report covers the design, development, hardware fabrication and testing of the communication System AN/USC-3(V) preproduction models. The time period was from 26 February 1963. Many customer requested additions, as wel as contractor product improvements were incorporated into the preproduction and subsequent production models of the Communications Central, AN/MSC-37, Radio Set AN/URC-40, and Radio Test AN/GRM-49. The design of the present equipment meets the requirements of the Contract, the Performance Test Specifications and the Production Acceptance Procedures. (Author)

AD-600 509 Div. 5, 30
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio
RADIO COMMUNICATION THROUGH THE COSMOS.
13 Apr 64, 5p
FTD TT-64-391, TT 64-11717

Unclassified report

Trans. from Pravda (Moscow) 1964, no. 27(16613) 27 Jan, p. 6.

Descriptors: (*Space communication systems, Communication satellites (Passive)), (*Radio communication systems, Communication satellites (Passive)), Balloons, Feasibility studies, USSR.

A generalized discussion of the problem concerning the possibility of ultra-long distance radio communication with the aid of man-made Earth satellites, particularly of an air balloon of the ECHO-2 type which went into polar orbit.

AD-600 774 Div. 5, 1, 19
OTS Price $0.75

HRB-Singer, Inc., State College, Pa.
INVESTIGATION OF ATC JOB AIDS FOR THE AN/TSQ-47 SYSTEM.
Rept. no. 4
by Allen C. Busch, Robert B. King, and Frederick J. Kirby. Oct 63, 26p HRBI353R4
Contract AF19 628 439
ESD TDR63 632

Unclassified report

Descriptors: (*Air traffic control systems, Air traffic controllers), (*Air traffic controllers, Air traffic control systems), (*Navigational aids, Air traffic controllers), Communication systems, Identification systems, Analog computers, Radar.

The report is the result of an investigation of controller job aids for the RAPCON operations of the AN/TSQ-47 EMS system. It presents an analysis of the operator tasks characteristic of mobile RAPCON operations and discusses job aids which might have application in future EMS RAPCONS for facilitation of job performance by reducing the requirements imposed upon the performer. Recommendations are made for the incorporation of computerized, and simplified mechanical aids. (Author)

AD-600 841 Div. 5, 1
OTS Price $2.00

Bell Telephone Labs., Inc., Whippany, N. J.
AIRBORNE COMMUNICATION SYSTEM: MARCOM RELAY, PHASE I.
Rept. no. 6 (Final), 15 Sep 63-1 Jun 64
1 Jun 64, 75p
Contract DA36 039sc89250, Proj. 1G6 40303D481

Unclassified report

Descriptors: (*Microwave relay systems, Airborne), *Microwave communication systems, Superhigh frequency, Radio transmission, Propagation, Microwaves, Air-to-air, Ground-to-air, Data, Data processing systems, Antennas, Radio equipment.

The objective of this investigation was to gather and analyze information on air-to-air and ground-to-air microwave propagation and transmission. The findings will aid in predicting the capabilities of multichannel microwave communication systems using airborne radio relay stations and should provide information basic to the design of airborne systems. (Author)

Topics included in that section discuss the structure of programs and storage, the programming language to be used, and the interface between the executive control program and the data handling programs. The second section, Monitor Program Specifications, exhibits the precise nature of the Monitor or executive control system. A portion of that section describes the operation of the Priority Scheduler, a critical part of the system which is the control center of the entire multiprogram system. (Author)

AD-600 713 Div. 6, 26
OTS Price $2.00

Santa Barbara Research Center, Goleta, Calif.
PRODUCTION ENGINEERING MEASURE. PbSe INFRARED DETECTORS - TYPE IR-200.
Quarterly progress rept. no. 5, 1 Jan-1 Apr 64
by G. H. Cook. 27 May 64, 71p SBRC5527 Q5
Contract DA36 039AMCO1466K,

Unclassified report

Descriptors: (*Infrared detectors, Production), Infrared equipment, Manufacturing methods, Quality control, Lead compounds, Selenides.

Approval of test facilities was obtained from USAEMSA. Recommended changes to the specifications of SCS-34A were obtained from USAEMSA. The preproduction run was not completed due to schedule delays and processing problems. Several manufacturing and inspection procedures were revised to reflect corrective actions and improvements. Approval was received for the Inspection and Quality Control Plan submitted to USAEMA. Contract schedule extension was requested and granted. (Author)

AD-600 855 Div. 6, 28
OTS Price $8.60

Visibility Lab., Univ. of California, San Diego.
PREDICTIONS OF SIGHTING RANGE BASED UPON MEASUREMENTS OF TARGET AND ENVIRONMENTAL PROPERTIES.
Final rept.
by Jacqueline I. Gordon. Sep 63, 91p SIO Ref63 23
Contract N123 60530 29657A

Unclassified report

Descriptors: (*Targets, Position finding), (*Position finding, Vision), (*Target position indicators), (*Ranges (Distance) Range finding), Visibility, Geophysics, Mathematical prediction, Ranges (Establishments), Aerial photography, Tracking.

During the summer of 1962 a field experiment was conducted at the U. S. Naval Ordnance Test Station, China Lake, California. This field test consisted of a coordinated program of visual sightings and measurements of the environmental and target properties appropriate to the observations. The specific task undertaken by the Visibility Laboratory was to aid in the design of the experiment to obtain the observations, to conduct the program of measurement of the environmental and target properties, and to use these data to predict the sighting ranges. This report contains a description of the design of the visual experiment, the details of the program of geophysical measurement, and the predicted sighting ranges. The observed sighting and recognition ranges will be published in a separate report by the Naval Ordnance Test Station. (Author)

AD-600 856 Div. 6, 28
OTS Price $8.10

Visibility Lab., Univ. of California, San Diego.
SUBMARINE VISIBILITY AND RELATED AMBIENT LIGHT STUDIES.
Final rept.,
by R. W. Austin and J. H. Taylor. Dec 63, 89p SIO Ref. 63 32
Contract N62306 1034

Unclassified report

Descriptors: (*Submarines, Visibility), (*Visibility, Submarines), (*Submarines, Detection), (*Underwater object locators, Underwater light), *Underwater lights, Optical equipment, Operations research, Aerial reconnaissance.

The major effort which was undertaken during the one-year period was to provide requested support for two field operations whose purpose was the study of the visibility of submarines from aircraft. Neither of these operations were successful in providing the primary information which was being sought due mostly to the vagaries of the weather and the Cuban blockade. Recommendations are given for a plan for a future operation with more carefully controlled conditions and more restricted and specific objectives. Data was submitted for examination which had been obtained on several cruises of the USS REDFIN to various areas in the Atlantic Ocean. Within the limitations imposed by the lack of adequate documentation on many of the records these data were reduced and analyzed. Recommendations are made for uses of the data obtained, for improved methods and instrumentation to be used to obtain data in the future. It is suggested that further data be obtained with careful documentation followed by additional study and analysis. Such a program should be able to provide a methodology for the use of ambient light measuring equipment to assist submarine commanders in the accomplishment of their operational mission. (Author)

input resistance, commutation ratio, and peak voltage. The equivalent circuit assumes that the inverter components are lossless and that the input current is constant. The transmitter was used to drive a 36-element array of variable-reluctance transducers which have a resonant frequency of 960 cycles per second. The distorted driving voltage from the inverter circuit did not adversely affect the acoustic performance of the projector array. Comparison of the measured and calculated performance of the inverter circuit indicates that the ac model gives sufficiently accurate results to allow prediction of inverter performance with a known load. (Author)

AD-600 429 Div. 6, 8
OTS Price $1.25

Electronic Defense Labs., Mountain View, Calif.
ERROR ANALYSIS OF PHASED-ARRAY DIRECTION FINDERS.
by John D. Bruce. 18 Feb 63, 49p EDL E79
Contract DA36 039SC87499

Unclassified report

Descriptors: (*Phased arrays, Antenna configurations), (*Direction finding, Errors), (*Multiple beam antennas, Direction finding), Errors, Analysis, Signals, Detection, Gain, Beams (Electromagnetic), Graphics.

An antenna array using multiple beams for direction finding has certain inherent errors associated with its use. Two error expressions are utilized to give a measure of the accuracy obtained using this antenna system. One of these is called the maximum average error and the other the expected error. Five different operating conditions are investigated. They are: (1) the ideal case, where all beams are assumed to have the same form; (2) the unequal beamwidth case, where the effect of broadening the beam pattern when directed away from broadside is considered; (3) the unequal gain, equal beamwidth case considers the effect of receiver gain imbalance; (4) the unequal gain, unequal beamwidth case, which is a combination of the effects of (2) and (3) above; and (5) the random signal detection case, which treats the problem of certain intercepts remaining undetected. Comparisons are made with the ideal case for all non-ideal operating conditions and are displayed in graphical form. The effect of beam broadening is shown to be quite small. (Author)

AD-600 538 Div. 6, 5, 8
OTS Price $2.00

Human Sciences Research, Inc., McLean, Va.
THE DEVELOPMENT OF AN INFORMATION SYSTEM FOR IDENTIFICATION AND RAID RECOGNITION IN AIR/SPACE DEFENSE. VOLUME I: INITIAL STEPS.
Final rept.
by W. S. Vaughan and T. R. Virnelson, Jr. Jul 63, 73p
Contract AF19 628 289, Proj. 4690, Task 469003
ESD TDR64 189 V1

Unclassified report

Descriptors: (*Detection, Data processing systems), (*Identification systems, Defense systems), (*Early warning systems, Defense systems), (*Communication theory, Defense systems).

The system development process is an art, particularly subject to a trial-and-error kind of methodology in its early stages where functional requirements are first delineated into an approximate solution. In the present study, some specific steps in the process of developing an identification and raid recognition information system for air defense were identified and some of the considerations involved at each step were spelled out. The development steps and the considerations they require of the developer were generalized from an examination of the evolution of identification and raid recognition procedures in SAGE, and supplemented first by the development of similar procedures in BMEWS and second by a hypothetical application of the steps to the development of similar procedures for a satellite threat environment. (Author)

AD-600 545 Div. 6, 2
OTS Price $5.00

General Electric Co., Syracuse, N. Y.
PASSIVE OPTICAL TECHNIQUES INVESTIGATION.
Final rept.
by A. D. French and O. R. Bakeman. Jan 64, 394p
Contract AF30 602 2886, Proj. 4506, Task 450601
RADC TDR63 415

Unclassified report

Descriptors: (*Space surveillance systems, Optical tracking), (*Optical tracking, Space surveillance systems), (*Satellites (Artificial), Detection), Stars, Resolution, Sky brightness, Atmospheric refractions, Target discrimination, Lenses, Handbooks.

The parameters and trades involved when using various passive optical techniques to separate earth orbiting objects from the celestial background and the capability of orbit prediction from angle only data are presented. In addition brief discussions of the celestial background, atmospheric effects, target brightness factors, lens (optical) design, detection theory and sensor capabilities are reported in modified handbook form. (Author)

AD-600 599 Div. 6, 8
OTS Price $4.60

Lockheed Missles and Space Co., Sunnyvale, Calif.
PERFORMANCE OF THE DELAY-LOCK TRACKING DISCRIMINATOR WITH BINARY SIGNALS.
Technical rept.
by R. A. Dye. Apr 64, 50p LMSC6 74 64 18

Unclassified report

Descriptors: (*Tracking, Discriminators), (*Discrimators, Delay lines), (*Radar tracking, Radar beacons), Performance (Engineering), Model tests, Signal-to-noise ratio, Doppler effect, Multipath transmission, Transients, Range finding, Low pass filters, Digital system, Delay circuits, Target discrimation.

This report describes the performance of the binary delay-lock tracking discriminator as evaluated from laboratory-simulated environments. A binary delay-lock discriminator was constructed and performance was observed when operated in noise, with doppler-shifted return signals, and with a multipath channel. Experimental verification of much of the earlier theoretical work was accomplished and, in some cases, performance in excess of that previously predicted was observed. From the results presented here, conclusions as to the suitability and advantage of using the delay-lock tracking technique can be formulated as well as obtaining further insight into the physical mechanism with which it operates. (Author)

AD-600 660 Div. 6, 30
OTS Price $3.50

Bendix Radio Div., Bendix Corp., Baltimore, Md.
AN/FPS-85 SPACE TRACK RADAR.
Quarterly technical documentary rept. no. 4
Apr 64, 204p
Contract AF30 602 2763
RADC TDR63 494

Unclassified report

Descriptors: (*Radar tracking, Programming (Computers)), (*Programming (Computers), Radar tracking), (*Radar range computers, Programming (Computers)), (*Space surveillance systems, Radar tracking), Computers, Programming languages, Data storage systems, Monitors, Computer logic.

The volume presents the programming techniques and computer program specifications which summarize the entire design analysis phase for the system computer. The results are presented in three sections. The first section, System Programming Organization, describes the programming techniques used in developing the operational computer programs.

The combined collector-radiator studies considered the thermal and structural stability of the assembly and devised and developed techniques for its fabrication. The assembly consists of a stretch-formed aluminum sheet to form the collector surface with tubes joined to the back side forming a conventional fin-tube radiator. A very promising low temperature working fluid was selected and evaluated by a series of thermal screening tests followed by a 1000-hour forced convection boiling-condensing loop test. The fluid selected is the aromatic hydrocarbon, ortho-xylene. To permit mounting of the two turbines of the binary system on a common shaft, a dynamic two fluid shaft seal was designed and briefly evaluated. The design is a combination face seal and centrifugal seal with a disengagement feature to unload the face seal during dynamic operation. Severe fluid instability was encountered and while the seal showed promise, available time and funding did not permit its solution. The studies definitely showed the practical feasibility of applying the binary Rankine cycle concept to space power conversion applications and indicated that it can provide a positive improvement in system weight and performance compared to competitive systems.

AD-600 365 Div. 7
OTS Price $2.75

Radio Corp. of America, Harrison, N. J.
THERMOELECTRIC POWER MODULES.
Rept. no. 4 (Final), 2 Jan-31 Dec 63.
by Hans P. Van Heyst. 31 Jan 64, 131p
Contract DA36 039AMC00110E,

Unclassified report

Descriptors: (*Modules (Electronics), Power supplies), (*Thermoelectricity, Generators), (*Energy conversion, Modules (Electronics)), Electric power production, Silicon, Germanium, Thermodynamics, Electrical properties, Design, Tests.Si

Silicon-germanium thermoelectric power modules were designed and developed. Modules operated satisfactorily under steady-state and thermal cycling conditions for several thousand hours. These modules were directly exposed to the exhaust gases of various fossil fuels and a number were also tested for shock and vibration. The data in this report will indicate that as a direct result of this research and development effort, a thermoelectric power module was developed which can be used as a building block in the design of thermoelectric power generators. Some effort was spent in obtaining heat transfer characteristics of heat exchangers under free and forced convection conditions. Because of the complex nature of computing the heat transfer properties, a direct analytical solution was not attempted. Much reliance was placed on test results obtained in laboratory experiments and on results reported in literature. The electrical characteristics of the modules were evaluated and an arrangement of either series or series-parallel was determined to satisfy the wide range of voltage and power requirements as specified in the contract requirements. Making use of the developed module design, conceptual 100-watt thermoelectric generator designs are discussed.

AD-600 395 Div. 7, 4
OTS Price $2.25

Yardney Labs., Inc., New York
DEVELOPMENT OF THE SEALED ZINC-SILVER OXIDE SECONDARY BATTERY SYSTEM.
Quarterly progress rept. no. 2, 1 Oct-30 Dec 63.
by Martin Sulkes. 30 Dec 63, 83p
Contract DA36 039AMC02238 E, Proj. 3A99 09 002,

Unclassified report

Descriptors: (*Storage batteries, Design), (*Batteries and components, Materials), (*Electrolytic cells), Silver, Zinc, Physical properties, Chemical properties, Electrical properties.

12AH sealed silver-zinc cells of standard construction when cycled at 120° F had poor capacity maintenance, due to separator deterioration. Cells cycled at room temperature showed poor charge acceptance at high rates of charge. Studies of the reaction of oxygen with zinc in 12AH cells indicate that the maximum overcharge rate possible with standard construction is 60-90ma or 1.2-1.8 ma/sq. in. The recombination reaction was found to be limited by the diffusion of oxygen through the electrolye. In the range of concentrations tested, 26.5-44% KOH, the lower the concentration the greater the rate of recombination. Data are presented on the physical, chemical and electrical properties of separators and interseparators. The use of one layer of high resistance membrane as a separator is not feasible. Most of the cells built with a single turn of Radiation Application, Inc. irradiated polyethylene shorted during the first charge. Positive electrode surface areas were studied by double layer capacitance. The result indicate that the area increase takes place during discharge. (Author)

AD-600 425 Div. 7
OTS Price $0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
COATING MATERIAL FOR PREVENTION OF ICE AND SNOW ACCUMULATIONS; FURTHER INVESTIGATIONS.
Final rept.
by Peter J. Hearst. 28 Apr 64, 7p
Task Y R007 08 04 410
NCEL N541 add.

Unclassified report

Descriptors: (*Electrical equipment, Ice prevention), (*Ice prevention, Materials), (*Ice, Adhesion), Coatings, Antennas, Snow.

The possibility of obtaining or developing a coating material to prevent ice and snow accumulation was further investigated. Qualitative ice adhesion and frost retention experiments indicated that all available materials would accumulate ice under the proper conditions. Although it might be possible to develop suitable coatings with low adhesion to ice, rather than no adhesion, the potential usefulness of such coatings to the Bureau of Yards and Docks does not appear to be sufficient to warrant further research at the present time. (Author)

AD-600 582 Div. 7, 25
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio
PULSE-LAMP-PARAMETER DETERMENATION BY OBSERVATION OF NONLINEAR OPTICAL PHENOMENA.
by A. N. Rubinov and A. P. Ivanov. 7 Apr 64, 8p
FTD TT64-153; TT 64-11689

Unclassified report

Unedited rough draft trans. of Akademiya Nauk BSSK [Minsk] Doklady, 1963, v. 7, no. 8, p. 524-527.

Descriptors: (*Light pulses, Measurement), Lighting equipment, Temperature, Effectiveness, Optical phenomena, Nonlinear systems, Luminescence, Absorption, USSR.

There is proposed a simple method which will make it possible to determine the temperature and the efficiency (coefficient of useful action) of a powerful source of light by the change in absorption capacity produced by it or the luminescence of a substance.

7. ELECTRICAL EQUIPMENT

AD-600 044 Div. 7
OTS Price $2.75

Aerospace Research, Inc., Boston, Mass.
PORTABLE BATTERY CHARGERS.
Quarterly process rept. no. 2, 1 Oct-31 Dec 63
by Robert B. Craven and Charles A. Moo. 28 Jan 64, 144p
ARI Pub 91
Contract DA36 039AMC02330E; Task 1G6 22001A053 05
Unclassified report

Descriptors: (*Battery charges, Portable), (*Modulators, Battery chargers), Power, Control, Circuits, Transistors, Rectifiers, Silicon, Inverters, Power transformers, Trigger circuits, Switching circuits, Batteries and components.

Basic battery charging configurations permitting control of charging power by use of switch modulation methods are presented. Circuits using both transistor and silicon controlled rectifier switch power modulators are described and compared. Pulse-width and pulse frequency modulation methods are examined from the standpoint of suitability for control of charging power. It is conculed that use of pulse-width switch modulation control of charger power results in a smaller required output circuit smoothing choke than is required using the pulse frequency control method. (Author)

AD-600 119 Div. 7
OTS Price $1.75

Ion Physics Corp., Burlington, Mass.
ELECTROSTATIC POWER GENERATOR.
Quarterly technical progress rept. no. 2, 15 Jan-15 Apr 64
by C. N. Coenraads. 15 Apr 64, 64p
Contract AF33 615 1168, Proj. 8128, Task 812808
Unclassified report

Descriptors: (*Electrostatic generators, Power equipment), Electric governors, Circuits, Vacuum seals, Electric insulation, Vacuum, Electrodes, Finishes and finishing, Surface properties, Hardness, Metal coatings, Dielectrics, Electric discharges, Pulse generators, Transformers, Field emission.

The generator system has been rebuilt completely. The atmosphere-to-vacuum seal has been designed and fabricated. The successful insulation of 35 kv between two 1000 sq cm electrodes with 1 mm separation has been accomplished. Further insulation studies have led to a deeper insight into the basic vacuum insulation problem. The study of excitation methods for the generator has led to a successful scale model test. (Author)

AD-600 250 Div. 7, 4
OTS Price $1.00

Columbian Carbon Co., Princeton, N. J.
CARBON BLACK FOR ORGANIC DEPOLARIZER BATTERIES.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 63
by M. T. Johnston and J. E. Smith. 31 Dec 63 31p
Contract DA36 039AMC03239E, Proj. 1G6 22001A053
Unclassified report

Descriptors: (*Batteries and components, Carbon black), (*Carbon black, Production control), Furnaces, Physical properties, Chemical properties, Tables, Effectiveness, Tests.

Carbon blacks from twenty statistically-designed runs on the 14R furnace have been evaluated in organic depolarized dry cells. Extensive data are also presented on physical and chemical characteristics of the experimental blacks. Initial service life of A-size cells discharged continuously through 16-2/3 ohms resistance to an end voltage of 0.9V ranged from about 22 to 27 hours. No single furnace variable studied was able to bring about changes in the carbon blacks produced which significantly improved the performance of organic cells containing the various carbon blacks. However, two interactions were found to be significant. (Author)

AD-600 251 Div. 7
OTS Price $2.00

Eagle-Picher Co., Joplin, Mo.
INVESTIGATIONS LEADING TO THE DESIGN OF A RELIABLE SEALED NICKEL-CADMIUM CELL.
Rept. no. 7 (Quarterly progress rept. no. 3) 1 Nov 63-31 Jan 64.
by C. O. Gosch. 28 Feb 64, 80p
Contract DA36 039AMC00135E, Continuation of Contract DA 36 039sc89084, Proj. 1G6 22001A 053 02
Unclassified report

Descriptors: (*Electrolytic cells, Design), (*Storage batteries, Materials), Batteries and components, Nickel compounds, Cadmium compounds, Electrolytes, Additives, Electrical properties, Alkaline cells, Reliability, Tests.

Data accumulated in studies made of several factors in design experiments and the response information obtained therefrom in the following have been analyzed: Additional Analyses of A Limited Overcharge Experiment, A Constant Overcharge Experiment, A Cycle Life Experiment, A Charge Retention Experiment. The design experiment was delineated and the response data were detailed for the factors: (A) electrolyte concentration, (B) additives, (C) type of sintered plaque, (D) type of separation, (E) type of negative plate, (F) type of cell. These design factors were carried forward at the several levels previously reported. An additional design experiment was delineated and the response data were detailed for the factors: (A) type of negative plate, (B) type of separation, (C) electrolyte concentration, (D) additive to the positive plaque. These design factors were carried forward all at four levels with the exception of the factor of positive plaque additive which was at two levels. The results of the analyses of the responses of the cells studied in the above experiments have been recorded and the influence of the various parameters have been shown. (Author)

AD-600 320 Div. 7
OTS Price $4.00

TRW Electromechanical Div., Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
APPLIED RESEARCH PROGRAM FOR BINARY RANKINE CYCLE ENERGY CONVERSION.
Final technical rept., Mar 62-Mar 63.
by C. H. Allen, S. S. Carlton, J. G. Lenhart, and R. R. Reimer. Apr 64, 266p TRW ER5925
Contract AF33 657 8101, Proj. 3145, Task 314502
APL TDR64 5
Unclassified report

Descriptors: (*Energy conversion, Rankine cycle), (*Rankine cycle, Energy conversion), (*Electric power production, Solar panels), (*Power supplies, Spacecraft), Fluids, Mercury, Hydrocarbons, Thermodynamics, Design, Feasibility studies.
The practical feasibility of binary Rankine cycle space power plants was considered and certain technical problem areas were given detailed attention. Specifically, analyses were made of both high and low temperature binary systems and compared with competitive single fluid Rankine power plants. Investigations were made into integration of the system's solar collector and waste heat radiator, the bottom cycle working fluid, and a dynamic, two fluid shaft seal.

AD-600 843 Div. 7, 8
OTS Price $1.50

Minneapolis-Honeywell Regulator Co., Hopkins, Minn.
LOW INPUT VOLTAGE CONVERSION REPORT NUMBER V.
Quarterly progress rept. no. 5, 1 Jul-30 Sep 63
by John T. Lingle and Sheldon D. Heaner. 30 Sep 63, 57p.
MH 64798
Contract DA36 039sc90808, Proj. 1G6 22001A053
Unclassified report

Descriptors: (*Voltage regulators, Design), Alternating current, Direct current, Circuits, Magnetic amplifiers, Rectifiers, Transistors, Performance (Engineering), Power supplies, Tests, Design.

The investigation of all known approaches, to determine the optimum methods of converting low voltage d-c power to higher voltage more usable d-c or a-c power for operating military electronic equipment was undertaken. Specifically the most feasible methods of converting the low output voltages of thermoelectric, thermionic, solar cells, fuel cells or other source voltages in the range of 0.1 volt to 1.5 volts will be determined. (Author)

Division 7 - ELECTRICAL EQUIPMENT

AD-600 658 Div. 7, 12
OTS Price $3.00

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
DESIGN OF HYDROGEN-OXYGEN CAPILLARY TYPE FUEL CELL.
Final technical rept., 15 May 62-31 Mar 64
by N. P. Bannerton and R. H. Hum. May 64, 165p
Contract AF33 657 8970, Proj. 8173, Task 817303
APL TDR64 54

Unclassified report

Descriptors: (*Spacecraft, Power supplies), (*Fuel cells, Spacecraft), Energy conversion, Batteries and components, Hydrogen, Oxygen, Capillary tubes, Environmental tests, Space environmental conditions, Weightlessness, Shock (Mechanics), Vibration, Acceleration.

An applied research program was initiated to adapt an existing Allis-Chalmers capillary type hydrogen-oxygen fuel cell for use in a space oriented 28 volt, 400 watt system. The program on the orbital package began with laboratory models which allowed preliminary investigation and evaluation of ideas leading toward package assembly and system operation. A temperature control system for the orbital package was developed which, depending on shroud temperature variations, provided evaporative cooling or automatic switching of the fuel cell load and 28 volt heaters. Environmental qualification tests including shock, vibration, acceleration and a one hundred hour thermal vacuum test were conducted successfully on the final package configuration. The orbital fuel cell package was also tested under short periods of weightlessness on a KC-135 jet aircraft at Wright-Patterson Air Force Base. This testing did not have any noticeable effect on the performance of the fuel cell package. Information acquired during the program was used to formulate a composite conceptual design of a fuel cell system for a space vehicle electrical energy source. (Author)

AD-600 662 Div. 7, 25
OTS Price $1.25

Avco-Everett Research Lab., Everett, Mass.
ROTATING MACHINERY UTILIZING SUPERCONDUCTORS.
by Z. J. J. Stekly and H. H. Woodson. May 64, 42p
Avco RR181
Contract DA44 009AMC236T,

Unclassified report

Descriptors: (*Generators, Design) (*Superconductors, Power equipment parts), *Rotor blades (Turbomachinery), Superconductivity, Armatures, Circuits, Design, Cryogenics, Mathematical analysis, Gas turbines, Refrigeration systems, Electrical equipment.

The properties of superconducting materials appropriate for a discussion of their application in rotating machines are cited. The electrical, mechanical, and thermal losses that will occur in superconducting rotating machines are defined and estimated. The requirements for maintaining the cryogenic environment are given in terms of refrigerant use and in terms of refrigeration. Some estimates are given of refrigerator size and efficiency. The results of a circuit analysis of an alternator are given to define the maximum performance in terms of circuit parameters. The results of an electromagnetic field analysis are used to relate circuit parameters to geometry and material properties. On the basis of these analyses some estimates are made of the specific mass of alternators with superconducting armatures and with ambient temperature armatures. These results are combined with the results of the loss analysis to obtain the overall specific mass and efficiency of each alternator system. Finally, a proposed system is presented for a 1000 kVA turboalternator having a specific mass of 1.85 pounds per kilowatt including the gas turbine, and refrigerator. (Author)

AD-600 753 Div. 7, 8, 26
OTS Price $14.50

International Resistance Co., Philadelphia, Pa.
INDUSTRIAL PREPAREDNESS MEASURE: RESISTORS, FIXED, FILM TYPE, GENERAL PURPOSE (HIGH STABILITY).
Final engineering rept., 8 Jun 59-26 Dec 63,
by Jerome G. Burns. 26 Dec 63, 213p
Contract DA36 039SC81283

Unclassified report

Descriptors: (*Fixed resistors, Films), (*Resistors, Manufacturing methods), Carbon, Plastics, Films, Manufacturing methods, Production, Quality control, Reliability (Electronics), Military requirements, Economics.

The objective of this Industrial Preparedness Measure was the development of a line of 5% and 10% resistance tolerance film type resistors having improved electrical performance stability and reliability, and which will be producible in large quantities at a cost comparable to specification MIL-R-11 carbon composition styles. The RC-07 and the RC-20 style passed all of the requirements of Pilot Plant testing with the following exceptions: 1) the RC-20 high ranges (100,000 ohms, 0.27 megohm and 0.50 megohm) marginally exceeded the quality assurance provisions as a result of either the 100 C load life or the 150 C no load tests. 2) A sport problem developed with the RC-07 style as a result of moisture cycle testing. This problem is related to the manufacturing process and should be eliminated thru continued production experience. Limited production experience gained during the preproduction and Pilot Plant operations indicated that the process yields and equipment operation of this pilot plant facility were satisfactory in all respects. A formal statistical analysis determined that the failure rate of this resistor (RC-07 and RC-20) is 0.147%. If the high temperature requirement is omitted, the failure rate becomes (0.116%) which compares favorably with the desired goal of (0.100%).

AD-600 833 Div. 7, 27
OTS Price $4.00

North American Aviation, Inc., Los Angeles, Calif.
INVESTGATION OF POWER CONVERSION AND GENERATION TECHNIQUES.
Rept. for 15 Apr 63-15 Feb 64
by J. E. Phillips, Emil Cima, and Larry Luera. 15 May 64, 295p
Contract AF33 657 11049, Proj. 8128, Task 812808
APL TDR64 53

Unclassified report

Descriptors: (*Electric power production, Space propulsion), (*Power supplies, Space propulsion), (*Electric propulsion, Power supplies), (*Generators, High frequency), Plasma jets, Acceleration, Energy conversion, Electric motors, Power transformers, Cooling, Materials, Reliability.

Contract objectives called for an analytic and experimental investigation of techniques whereby an efficient and lightweight power conversion unit can be provided. The conversion unit is to be used to supply high-frequency electric power to accelerate plasmas in an electric propulsion engine. Various conversion and power generation techniques were reviewed in the early part of the study before approaches and concepts were established. In addition to the converter concepts, an additional investigation of high-frequency power generation was performed. After the preliminary investigation, an analysis of possible approaches for conversion of 60 KW of SNAP 8 type of power and 300 KW of SPUR typ of power was made and conceptual designs established. Three converter techniques in addition to a high-frequency generator concept were evaluated; namely, a motor-generator unit, a static transistor unit and a static tube unit. Parametric data was derived and is included in this report to show component losses, size and weight. Problem areas under each conversion technique are outlined and areas for future applied research recommended. (Author)

AD-600 024 Div. 8, 26
OTS Price $2.75

Raytheon Co., Lewiston, Maine.
PRODUCTION ENGINEERING MEASURE: RELIABILITY IMPROVEMENT: SILICON ALLOY TRANSISTOR. VOLUME I.
Final engineering rept, 25 Jun 62-26 Dec 63
by R. W. Jones, A. W. Postlethwaite, and L. F. Leary.
26 Dec 63. 142p
Contract DA36 039sc86744

Unclassified report

Descriptors: (*Transistors, Silicon alloys), (*Quality control, Manufacturing methods), (*Production control, Engineering), Semiconductor devices, Reliability (Electronics), Military requirements.

Values and controls for silicon resistivity, lifetime, orientation and crystalline perfection were determined. Chip dimensional tolerances were tightened. The mechanical design and methods of assembly were changed to give lower T sub j, to permit higher stressing levels and to insure cleaner junctions. Electrolytic and vibratory etching were developed and optimized. Electrolytic rinsing was introduced. Improved basecoat curing and nitrogen packaging were implemented. A combination of 200 C bake and 400 mw burn-in post seal stabilizing stress was proven optimum. The use of a thermographic phosphor to monitor 100% burn-in made this operation statistically significant. Power step stress as a rapid reliability ranking method was shown to be effective. A production run was carried out and the improved reliability of the product demonstrated. A complete process manual, an approved inspection and quality control plan, consolidated production run data (including yields, parameter distributions, and characteristic parameter curves) and photographs of all special equipment are included as required by the contract. (Author)

AD-600 025 Div. 8, 26
OTS Price $4.00

Raytheon Co., Lewiston, Maine.
PRODUCTION ENGINEERING MEASURE: RELIABILITY IMPROVEMENT: SILICON ALLOY TRANSISTOR. VOLUME II: PROCESS SPECIFICATION MANUAL.
Final engineering rept. 25 Jun 62-26 Dec 63
26 Dec 63, 299p
Contract DA36 093sc86744

Unclassified report

Descriptors: (*Transistors, Silicon alloys), (*Quality control, Manufacturing methods), (*Instruction manuals, Production control), Semiconductor devices, Specifications, Mechanical drawings, Reliability (Electronics).

Operation standards which describe equipment, materials, procedures, quality control and safety are presented. Material purchasing standards are also described and cover the following items: Chemical analysis, physical properties, lot verification, performance, packaging, marking, rejection, approved vendors, safety, storage and sampling and approval.

AD-600 026 Div. 8, 26
OTS Price $4.00

Raytheon Co., Lewiston, Maine.
PRODUCTION ENGINEERING MEASURE: RELIABILITY IMPROVEMENT: SILICON ALLOY TRANSISTOR. VOLUME III: QUALITY CONTROL MANUAL.
Final engineering rept. 25 Jun 62-26 Dec 63
26 Dec 63, 269p
Contract DA36 039sc86744

Unclassified report

Descriptors: (*Transistors, Silicon alloys), (*Quality control, Instruction manuals), Semiconductor devices, Reliability (Electronics), Specifications, Material forming.

This Manual is a compilation of several volumes of working documents. In-plant, general divisional procedures, materials process specifications and prints, assembly process specifications and prints, test specifications and procedures, and quality inspection procedures are held as separate groupings maintained up to date. This Quality Control and Inspection Manual represents the latest revisions as of 15 November 1963 and will not be maintained up to date. (Author)

AD-600 028 Div. 8
OTS Price $0.50

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
SEMICONDUCTOR SWITCHING AND LIMITING USING 3 DB SHORT SLOT (HYBRID) COUPLERS.
by V. J. Higgins. Jan 64, 14p
Task 1G6 22001A056 04 21
AELRDL TR2409

Unclassified report

Descriptors: (*Varactor diodes, Germanium), (*Waveguide couplers, X band), (*Electronic switches, Semiconductor devices), (*Limiters, Radiofrequency power), Microwave equipment, Broadband, Diodes (Semiconductor), Bonds, Silver, Waveguide slots.

The report describes and X-band shunt mode semiconductor switch and limiter using silver-bonded germanium varactors and 3 db short slot (hybrid) couplers. When the balanced arms or a 3 db short slot coupler are terminated in perfectly matched loads, the output arm will be thoroughly isolated from the input arm; when the balanced arms are short-circuited, the output arm will be directly coupled to the input arm with little or no loss. Voltage dependent variations in the impedance level of silver-bonded diodes are used to switch between matched and mismatched conditions providing isolation or low insertion loss. Details of an externally biased semiconductor switch and a passive power limiter are included. (Author)

AD-600 032 Div. 8, 6, 25
OTS Price $1.25

Naval Ordnance Lab., Corona, Calif.
MEASUREMENTS OF SILICON PHOTODIODE CHARACTERISTICS UNDER BACKGROUND RADIATION CONDITIONS.
by C. M. Kaloi. 1 Mar 64, 44p
NOLC 595

Unclassified report

Descriptors: (*Semiconductor devices, Performance), (*Photoelectric cells (Semiconductor), Interference), (*Diodes (Semiconductor), Background), (*Silicon, Photoelectric effect), Solar radiation, Detectors, Photoconductivity, Measurement.

The performance characteristics of the silicon photodiode under different background conditions are evaluated experimentally and, to a lesser degree, analytically. The performance characteristics investigated are responsivity, frequency response (time constant), noise-equivalent power, spectral response, and dynamic impedance. In the tests, these characteristics were measured with the diode subjected to direct sunlight and to various levels of simulated sunlight. (Author)

8. ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-600 001 Div. 8
OTS Price $2.60

Institute of Research, Lehigh Univ., Bethelem, Pa.
TRANSISTOR CHARACTERIZATION AND ACTIVE NETWORK STUDIES
Interim technical rept.
31 Mar 64, 27p
Grants 2SC 61; DA SIG36 039 60 G2

Unclassified report

Descriptors: (*Diodes (Semiconductor), Electrical properties), (*Transistors, Performance (Engineering)), Networks, Capacitors, Microwave equipment, Electronic switches.

The PIN diode is under study with special attention toward its properties (a) as a charge storage device, and (b) as a microwave switch. The charge storage studies consist of: a theoretical calculation of the length of the storage time and of the amount of charge remaining at the end of this period; a calculation of the time in which the reverse current decays to zero; an experimental investigation of the reverse transient using pulse and sinusoidal signals. Diodes of different structures have been tested for snap-off applications; the diode with most favorable properties showed a lifetime of about 100 nanoseconds and snap-off times in the range of 1 to 3.5 nanoseconds. PIN diode microwave switches have been designed to operate with direct current bias generated from the microwave signal itself. Such switches exhibit either negative or positive feedback and thus should have useful applications.

AD-600 017 Div. 8
OTS Price $2.75

Electronic Communications, Inc., Timonium, Md.
TWO-DIMENSIONAL SELF-FOCUSING ARRAY ANTENNA MODEL.
Final rept.
Mar 64 133p
Contract AF30 602 2930, Proj. 4506, Task 450604
RADC TDR64 40

Unclassified report

Descriptors: (*Antennas, Performance), (*Antenna radiation patterns, X Band), Focusing, Targets, Scattering, Communication systems, Radar beacons.

A report is given on an experimental program on the performance of a two-dimensional self-focusing antenna. The design of the 64 element, 75 by 75 wavelength X-band model is described together with the methods and equipment used in acquiring the test data. The extensive results obtained are summarized and evaluated with respect to estimated performances. The experimental program included a study of the relationship of target configurations and array antenna element arrangements to the operating characteristics of the self-focusing array. A brief study of the scattering from metal spheres in the presence of a converging wavefront was also conducted. The measured results of the program are presented in the form of radiated field patterns. (Author)

AD-600 018 Div. 8, 6, 25
OTS Price $0.75

Sylvania Electric Products, Inc., Mountain View, Calif.
OPTIMIZED COHERENT OPTICAL RECEIVER TECHNIQUES.
Quarterly rept. no. 2
by Mahlon B. Fisher. Mar 64, 23p
Contract AF30 602 3162, Proj. 4506, Task 450602
RADC TDR64 74

Unclassified report

Descriptors: (*Electron guns, Design), (*Detectors, Phototubes), Optical images, Microwaves, Scanning, Optical equipment, Lasers.

The design and testing of the image dissector electron gun was successfully completed. The scanning capability of the electron gun was demonstrated by the video presentation and tracking of a small spot of light at any point on the photosurface. The optimum values of magnetic deflection and focusing fields were experimentally found to be within 10% of the design values. Work on the final phase of the program was started with the construction of the first complete scannable microwave photodetector.

AD-600 019 Div. 8
OTS Price $1.25

Eitel-McCullough, Inc., San Carlos, Calif.
HIGH POWER X-BAND GENERATOR.
Quarterly rept. no. 5, 1 Oct-31 Dec 63
by William R. Luebke, Jared Leidigh, and Tore Wessel-Berg.
12 Feb 64, 42p
Contract AF30 602 2756, Proj. 5573, Task 557303
RADC TDR64 77

Unclassified report

Descriptors: (*Microwave amplifiers, X Band), (*Klystrons, Design), (*Waveguides, Design), Generators, Power, Electron guns, Cavity resonators, Wave transmission, Waveguide windows, Circuits, Diodes, Theory.

The purpose of the program is to develop a klystron amplifier operating at 8 kMc and delivering one megawatt of CW power. Results are presented on a low average power pulsed tube having an extended-interaction output cavity. Further development work on the output cavity is discussed. An interim tube designed to be capable of more than a hundred kilowatts of average power was constructed and is being prepared for testing. The lossy waveguide water loads are briefly described. A theoretical analysis and discussion of the mode overlapping problem in extended-interaction circuits is presented. (Author)

AD-600 020 Div. 8, 5
OTS Price $2.50

Georgia Inst of Tech., Atlanta. Engineering Experiment Station.
COMMUNICATIONS INTERFERENCE REDUCTION STUDIES.
Final technical rept.
by D. W. Robertson. Apr 64, 107p
Contract AF30 602 2904; Proj. 4540, Task 454003
RADC TDR64 80

Unclassified report

Descriptors: (*Radiofrequency interference, Reduction), (*Suppressors, Design), Switching circuits, Filters (Electromagnetic wave), Preamplifiers, Communication equipment.

This report describes a series of suppression devices and techniques which can be applied to existing receivers with a minimum of receiver modification. Devices are described which are effective in reducing CW as well as pulse interference. Frequency translation, outphasing and switching techniques are examined. A discussion of UHF tunnel diode amplifiers is also included. (Author)

AD-600 096 Div. 8
OTS Price $1.60

United Aircraft Corp., East Hartford, Conn.
PLASMA PROPERTIES IN A THERMIONIC CONVERTER.
by R. H. Bullis and W. J. Wiegand. 25 Mar 64, 11p
Contract AF49 638 1221
AFOSR 64 0898
Unclassified report

Presented at the 24th Annual Conference on Physical Electronics at M. I. T. March 25-27, 1964.

Descriptors: (*Plasma physics, Thermionic converters), (*Thermionic converters, Plasma physics), Electrostatics, Probes (Electromagnetic), Electrons, Energy, Distribution, Cesium.

The properties of the non-equilibrium plasma existing in the interelectrode space of the arc-mode converter were investigated with coaxial electrostatic Langmuir probes. Probe measurements were made as a function of cesium pressure, emitter temperature, interelectrode position and converter output in several low-temperature arc-mode converters. The plasma potential, was found to vary significantly across the interelectrode space. Both the existence of a retarding sheath for electrons very close to the emitter surface and a region farther from the emitter in which the variation in plasma potential is accelerating for electrons have been detected. Significant variations in the plasma potential existing in the space were observed with changes in emitter temperature, cesium pressure, and converter output. The electron energy distribution is non-Maxwellian with a significant number of electrons with energies in excess of 1.4 eV. However, from an analysis of the production and loss rates in the converter, there is an insufficient number of electrons, even in the accelerated electron energy distribution, to account for the enhanced degree of ionization observed in arc-mode operation by single stage electron-atom collisional ionization processes. Further analyses of the production and loss rates using the electron energy distribution indicate that ambipolar diffusion is the dominant loss process in the converter if the major ionic species is Cs(+). However, if the major ionic species in the converter is Cs sub 2(+), then recombination is the dominant loss mechanism. (Author)

AD-600 099 Div. 8
OTS Price $2.00

Bell Telephone Labs., Inc., Murray Hill, N. J.
ENGINEERING SERVICES ON TRANSISTORS.
Rept. no. 14 (Quarterly progress rept. no. 3) 1 Oct-31 Dec 63
by J. J. Chang, D. J. D'Stefan, R. Edwards, J. E. Iwersen, and J. Kocsis. 30 Mar 64, 80p
Contract DA36 039AMCO2227E, continuation of
Contract DA36 039sc90759, Proj. 1G6-22001A056
Unclassified report

Descriptors: (*Transistors, Germanium), (*Integrated circuits, Transistors), Microwave frequency, Electrodes, Oxides, Nickel, Plating, Photoengraving, Silver, Aluminum, Silicon, Propagation, Diodes (Semiconductors), Computer logic, Computers.

This report discusses work on a 6-Gc low-power germanium transistor and integrated circuit devices. Status of the work on a 6-Gc low-power germanium transistor is reported. Techniques for fabricating the oxide-photoengraved planar structure are evaluated. Electrode stripes of 1 micron in width and submicron electrode spacings appear feasible. The equivalent circuit parameters of four transistor structures are analyzed. Preliminary studies of special wafer-mounting structures to minimize parasitic effects for compatible circuit installation are reported. Results of multiple-chip integrated circuits using specially designed transistors are described. Storage times have been reduced and measured propagation times are lower. Both DCTL and LLL are considered. A paper study is presented which explores various ways of integrating a four-bit adder within the limitations of the ten-pin TO-5 header. It was found that the number of cans can be halved if relatively complex specially tailored packages are used instead of simple two-gate or three-gate packages. An integrated circuit scheme involving a glass-cemented mosaic of silicon is described. (Author)

AD-600 105 Div. 8
OTS Price $0.50

Antenna Lab., Ohio State Univ. Research Foundation, Columbus.
RESEARCH ON TECHNIQUES FOR INTEGRATION OF ACTIVE ELEMENTS INTO ANTENNAS AND ANTENNA STRUCTURE.
Interim engineering rept., 1 Dec 63-29 Feb 64
1 Mar 64, 15p OSURF 1566 9
Contract AF33 657 10386 Proj. 6278, Task 627801
Unclassified report

Descriptors: (*Integrated circuits, Antennas), (*Antennas, Integrated circuits), Switching circuits, Solid state physics, Direction finding, Antennas configurations.

Circuitry for an elementary direction-finding system using integrated design concepts is discussed. An array of integrated dipole elements with both electronic phase and gain control is described. A lobe-switching, log-periodic dipole array which uses a high-frequency diode as the switching element is discussed. Patterns are presented. (Author)

AD-600 116 Div. 8
OTS Price $5.60

Cooley Electronics Lab., Univ. of Michigan, Ann Arbor.
STUDY AND INVESTIGATION OF A UHF-VHF ANTENNA.
Bimonthly rept. no. 6, 2 Nov 63-2 Jan 64.
by J. E. Herman and S. B. Rhee. Mar 64, 59p ORA-5549 6P
Contract AF33 657 10607,
Unclassified report

Descriptors: (*Slot antennas, Optimization), (*Spiral antennas, Optimization), (*Ferrites, Antennas), Antennas, Ultra-high frequency, Very high frequency, Ferromagnetic materials, Powders, Antenna radiation patterns, Bandwidth.

Design criteria for optimal use of ferrites in rectantular slot radiators were established. Analysis firmly indicates that similar optimization can be achieved for annular slot antennas. Further experiments with log conical spirals were performed which resulted in extension of frequency range. A log conical antenna taking full advantage of the frequency range of the available ferrite powder was made. The thickness of ferrite surrounding log conical antenna elements appears to be a negligible factor. An analytical study of the equiangular spiral which can be adapted to the introduction of layers of ferrite was completed. Computer results for specific cases are not yet available. Preliminary test data on a log zig-zag antenna using powdered ferrite are presented. (Author)

AD-600 118 Div. 8
OTS Price $1.25

Clevite Corp., Cleveland, Ohio.
RESEARCH INTO NEW APPROACHES FOR VHF FILTER CRYSTALS.
Quarterly rept. no. 3, 1 Nov 63-31 Jan 64
by D. R. Curran and D. J. Koneval. 19 Mar 64, 44p
Contract DA36 039AMCO2245E, Proj. 3A99-15-001
Unclassified report

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-600 046 Div. 8
OTS Price $3.50

Hughes Aircraft Co., Fullerton, Calif.
PRELIMINARY DESIGN STUDY OF A FLAT PLATE REFLECTOR AND SUPPORT UNIT.
Final rept., 15 May 63-14 Jan 64
by Allen C. Schell. 8 May 64, 210p HAC FR64 14 69
Contract AF19 628 2994; Proj. 0000;
AFCRL 64 285

Unclassified report

Descriptors: (*Antenna components, Design), (*Wind, Stresses), Antenna masts, Antenna feeds, Metal plates, Aluminum, Wire, Supports, Antennas.

The objective of the study is to perform calculations and accumulate data that will show the interrelations among various performance parameters of a flat-plate reflector and support system capable of positional adjustment in three dimensions, and to estimate the cost of such a system. The report includes investigations of various plate designs, support structures, and drive-positioning methods, all of which are designed to meet a nominal set of conditions. The relationship between the cost and reasonable deviations from these conditions is also delineated. From these investigations and related studies of power consumption, soil conditions, etc., sufficient data are available to permit the preparation of a set of system-design specifications. (Author)

AD-600 048 Div. 8
OTS Price $2.25

Northeastern Univ., Boston, Mass.
COMMUNICATION THEORY GROUP.
Final rept. 1 Jun 61-30 Nov 63
by Sze-Hou Chang, Walter H. Lob, David C. Lai, Flavio B. Reis, and Alberto R. Galmarino. 31 Dec 63, 94p
Contract AF19 604 7494; Grant AF AFOSR62 371;
Projs. 4610; 5628; Tasks 461003; 562801
AFCRL 64 12

Unclassified report

Descriptors: (*Communication theory, Signals), (*Signals, Wave transmission), (*Coding, Communication theory), Electromagnetic waves, Geometric forms, Integral transforms, Statistical functions, Detectors, Pulse modulation, Demodulation, Signal-to-noise ratio, Linear systems, Matrix algebra, Probability, Optimization.

Signal waveform design according to the following criteria is described: (1) orthogonality, (2) compact time support, (3) identical autocorrelation functions, (4) specified autocorrelation functions. A scheme for improving the SNR of a PCM system and a maximum-likelihood detector for a binary channel with memory are summarized. An approximate representation of linear time-varying systems in matrix form is presented. (Author)

AD-600 049 Div. 8
OTS Price $0.50

Electronics Research Lab., Univ. of California, Berkeley.
JOINT SERVICE ELECTRONICS PROGRAM.
Final rept., 15 Feb 63-14 Feb 64
by D. O. Pederson and J. R. Whinnery. 31 Mar 64, 10p
ERL 64 12
Grant AF AFOSR139 63
AFOSR 64 0900

Unclassified report

Descriptors: (*Electronics, Bibliographies), Scientific research, Reports.

A listing is given of talks, memoranda, technical reports, and published research reports resulting from research done from Feb. 1963 to Feb. 1964 by ERL under the Joint Service Electronics Program.

AD-600 084 Div. 8, 2, 6
OTS Price $0.50

Aerospace Corp., Los Angeles, Calif.
IMAGE DESIGN FOR TERRAIN-MAPPING RADAR SYSTEMS.
by Jean A. Develet, Jr. 15 May 64, 16p TDR269 9990 6
Contract AF04 695 269
SSD TDR64 94

Unclassified report

Descriptors: (*Radar images, Design), (*Mapping, Radar), Radar reflections, Noise (Radar), Images, Theory, Data processing systems, Signal-to-noise ratio.

The theory of parameter estimation is applied to the problem of mapping radar image design. A post-detection processing technique guided by this theory yields quantitative interrelations among important final image parameters, i. e., number of grey levels of a specified confidence factor, dynamic range, and final image sample distance. In turn it is found that specification of the foregoing places sample distance and minimum SNR requirements on the raw radar data prior to processing. The formulas, table, and curves presented, although for an ideal terrain-mapper, give insight as to the quantity of data necessary to produce terrain maps of a specified quality. (Author)

AD-600 094 Div. 8, 26
OTS Price $0.50

General Electric Co., Schenectady, N. Y.
PRODUCTION ENGINEERING MEASURE FOR VOLTAGE-TUNABLE MAGNETRONS.
Quarterly progress rept. no. 7, 18 Oct 63-18 Jan 64
by E. G. Soulier. 18 Jan 64, 20p
Contract DA36 039sc86722

Unclassified report

Descriptors: (*Magnetrons, Manufacturing methods), (*Production control, Magnetrons), Electron tubes, Filaments, Voltage, Tuned circuits, Packaged circuits, Quality control.

The various problem areas and their solutions are stated for the two package types. The results and conclusions of the filament-growth investigation are discussed. The latest yield percentages obtained for the basic tube assembly are given. The status of the preproduction run for the ZM-6103 and ZM-6104 packages is described. Results in the quality-control area on the procedures for procuring filaments are given.

AD-600 095 Div. 8
OTS Price $0.75

Lockheed Aircraft Corp., Sunnyvale, Calif.
OPTICAL IMAGE CONVERTERS: AN ANNOTATED BIBLIOGRAPHY, 1961-1963.
comp. by Jack B. Goldmann. Jan 64, 24p
LMSC8 13 64 1, SB64 5

Unclassified report

Descriptors: (*Optical equipment, Bibliographies), (*Bibliographies, Optical equipment), Optical images, Image tubes, Image intensifiers (Electronics), Abstracting, Indexes.

A literature search was made to determine the variety of techniques which have been utilized in the development of the optical image converter. This annotated bibliography of 45 references emphasizes the advances and innovations for the years 1961-1963. The resources of the Lockheed Missiles and Space Company Technical Information Center were used in the preparation of this bibliography. (Author)

tions by means of an elementary calculation. Convergent power series solutions of these integro-differential equations are readily obtained for small enough ka, when it is assumed merely that the excitation is sufficiently regular in the aperture. These results are employed to derive the first terms in the power series expansions of the far fields, the edge fields, the aperture fields and of the transmission coefficients. When the incident transverse electric and magnetic modes are specialized to those which occur in plane wave excitation these expressions are found to reduce to the well-known plane wave formulas obtained by other means. (Author)

AD-600 142 Div. 8
OTS Price $0.50

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
TRANSISTOR CHARACTERIZATION AND DERATING FOR SECOND BREAKDOWN.
by Bernard Reich and Edward B. Hakim. Jan 64, 17p
Task 1G622001A056-01
AELRDL TR2403

Unclassified report

Descriptors: (*Transistors, Performance (Engineering)), (*Reliability (Electronics), Transistors), Electric currents, Voltage, Degradation, High temperature research, Silicon, Temperature, Performance (Engineering).

Two modes attributing to secondary breakdown in transistors have been found - the current and voltage modes. Localized spots due to current constriction as a result of either mode causes an exponential rise in thermal resistance prior to secondary breakdown. These localized secondary breakdown spots have been calculated to be between 900 - 1100 C in silicon. The study indicates that the maximum secondary breakdown power is a function of the device design and should be considered in light of other device performance requirements. (Author)

AD-600 163 Div. 8
OTS Price $1.00

General Electric Co., Owensboro, Ky.
DEVELOPMENT OF AN IMPROVED JAN 6299.
Quarterly progress rept. no. 10, 1 Jan-31 Mar 64
31 Mar 64, 32p
Contract DA36 039SC85953

Descriptors: (*Electron tubes, Production,), Cathodes (Electron tubes), Ceramic materials, Coatings, Temperature, Standards, Tables.

The objective requirements for the improved tube are Signal Corps Technical Requirement SCS-90 (Improved JAN 6299) and operation at a tube temperature rating of 225C. The areas under investigation are: improved alignment, concentricity and ceramic strength; improved anode to ceramic seal; temperature control at exhaust; improved application of cathode coating; improved cathode mounting; improved processing for higher temperature operation; improvement in humidity testing; improved exhaust fixturing; and extended life test and tube failure analysis.

AD-600 167 Div. 8, 2
OTS Price $0.75

Army Electronics Research and Development (Agency), Fort Monmouth, N. J.
MODIFICATIONS TO RADIOSONDE RECORDER AN/TMQ-5C.
by George E. Etzel. Dec 63, 23p
Task 1A025001A126-08
AELRDL TR2406

Unclassified report

Descriptors: (*Recording systems, Radiosondes), (*Radiosondes, Recording systems), Sounding rockets, Atmospheric sounding, Meteorological instruments.

The report presents a descriptive review of a number of modifications made to the Radiosonde Recorder AN/TMQ-5 (meteorological recorder) used with a radiosonde-rawin set atmospheric sounding system. The purpose of these modifications was to increase the usefulness and versatility of the radiosonde recorder in research and development work. Tests conducted after the modifications indicated considerable improvement of the radiosonde records obtained from radiosondes transmitting fast-changing information, such as AN/AMT-15, and AN/AMQ-9, and Rocketsonde AN/DMQ-6, or when used with a Rawin Set AN/GMD-2 type system. (Author)

AD-600 168 Div. 8
OTS Price $0.50

Air Force Avionics Lab., Research and Technology Division, Wright-Patterson AFB, Ohio.
IMPROVED LONG WAVELENGTH RESPONSE OF PHOTOEMISSIVE SURFACES.
Technical documentary rept.
by Bilyie E. Rambo. Apr 64, 20p
Proj. 4156, Task 415605
AL TDR64 19

Unclassified report

Descriptors: *Photocathodes, (*Photoelectric effect, Surfaces), (*Photoelectric materials, Emissivity), Cathodes (Electron tubes), Iconoscopes, Radar receivers, Lasers, Reflection.

The usefulness of photoemitters as detectors for optical lasers is limited by their very poor quantum efficiency in the red and infrared portion of the spectrum. For example, the quantum sensitivity of the S-20 photosurface at 0.7 microns is approximately 0.25%. However, some 70% of the incident radiation at 0.7 microns is transmitted through the semi-transparent S-20 surface and is lost. In the experiment, the incident light from a monochromator was trapped by total internal reflection in the faceplate, resulting in multiple encounters of the light with the photocathode and, consequently, in a high degree of absorption by the cathode. Gains of three and five times the normal sensitivity of the S-20 photosurface at 0.7 micron were observed using this technique, depending on the polarization of the incident light. Curves showing the spectral dependence of this gain for both axes of polarization are presented. The internal reflection technique may be applied to any tube having a flat faceplate backed by a semi-transparent photocathode. However, any imaging capability of the tube is lost. (Author)

AD-600 174 Div. 8, 15
OTS Price $0.75

Honeywell, Inc., Minneapolis, Minn.
PARAMETER ESTIMATION IN NOISY SYSTEMS.
by V. S. Levadi. 6 May 64, 27p HI M207

Unclassified report

Descriptors: (*Linear systems, Noise), (*Iterative methods, Linear systems), Signals, Vector analysis, Matrix algebra, Mathematical models, Differential equations.

A class of iterative procedures for estimating the parameters of a linear dynamic system are examined. In the presence of measurement noise, other noise in the measured state of the system is shown to produce a biased estimate of the parameters. The nature of this bias is determined by the covariance matrices of the state vector and the noise vector.

Descriptors: (*Crystal filters, Very high frequency), (*Quartz resonators, Design), Electrodes, Radiofrequency filters, Very high frequency, Quartz crystals, Theory, Resonance, Vibration, Etched crystals.

Experiments with rectangular electrodes on 10 Mc AT-cut quartz wafers have verified the dependence, predicted by energy-trapping theory, of fundamental and inharmonic overtone mode frequencies on resonator design parameters. From these, a generalization of the Bechmann criterion on maximum electrode dimensions has been proposed to include crystallographic orientation and the effect of electrode mass-loading. Feasibility for multi-electrode filter crystals has been demonstrated with the fabrication of two samples with 4 dot-resonators per wafer. Each set of dot-resonators was electrically connected in parallel to form the equivalent of an oversized single resonator, with resultant motional characteristics adding in the predicted fashion. This technique should allow an extension of the range of motional characteristics available in VHF filter crystals and in turn should lead to greater flexibility in filter network synthesis. (Author)

AD-600 120 Div. 8, 14, 26
OTS Price $9.10

Photocircuits Corp., Glen Clove, N. Y.
PRODUCTION ENGINEERING MEASURE FOR MULTILAYER PRINTED WIRING BOARD.
Quarterly rept., nos. 4 and 5 (Rept. no. 4) 1 Apr - 30 Sep 63
by G. Messner, R. McCaw, and M. Paluszek. 30 Sep 63, 107p
Contract DA36 039SC86745

Unclassified report

Descriptors: (*Printed circuits, Production), (*Subminiature electronic equipment, Manufacturing methods), Laminates, Soldering, Drilling machines, Quality control, Standards, Tests, Adhesives, Epoxy plastics, Glass textiles.

Evaluation of processes for manufacture of layered printed wiring using the clearance hole method of manufacture resulted in the selection of the wave soldering method for fillet formation on individual layers, the use of multispindle drilling machines for drilling clearance holes in individual layers and component holes in laminated parts, and in some other minor changes which will improve the efficiency of the production line and the quality of the product. The finalizing of processes made it possible to establish production rates, manpower and lead time requirements, and to schedule all operations except spot facing, which is still undergoing investigation to determine the optimum method. Testing of the second set of 50 engineering samples was completed. They met the requirements of SCL-7503B specification with minor deviations. Corrective measures to eliminate such deviations from preproduction samples are recommended. Work on the Quality Assurance Manual and Inspection Plan, as well as on preparation of specifications for Prepreg epoxy adhesive material, is continuing. (Author)

AD-600 126 Div. 8, 14, 17, 26
OTS Price $1.00

Beryllium Corp., Reading Pa.
PRODUCTION ENGINEERING MEASURE FOR BERYLLIUM OXIDE AND PARTS PRODUCED FROM IMPORTED ORES.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 63
by J. F. Blum and W. R. Raymont. 31 Dec 63, 37p
Contract DA36 039AMCO1481E

Unclassified report

Descriptors: (*Beryllium compounds, Oxides), (*Structural parts, Ores (Metal sources), (*Refractory materials, Industrial production), (*Powder metallurgy, Mechanical working), (*Electronic equipment, Materials), Metal plates, Mechanical properties, Sintering, Thermal conductivity, Electrical properties, Specifications.

Physical property measurements have been completed on beryllium oxide test pieces that were produced from standard powder and fabrication processes employed at the initiation of the contract. Tests were performed as per MIL-I-10A unless otherwise specified. The fabricated shapes were 99 percent pure and were a minimum of 96 percent of theoretical density. Average test values are as follows: Dielectric constant and loss factor - 6.43 and 0.00089 respectively at 23 C. Dielectric strength - 209 volts/mil at room temperature. Flexural strength - 26,000 p.s.i. at room temperature. Thermal Conductivity - 1516 B.T.U. x in./hr. x sq ft x F at 100 F 1056 B.T.U. x in./hr. x sq ft x F at 280 F. Four typical beryllium oxide parts for use in the electronics industry have also been produced to required specifications employing standard fabrication processes. (Author)

AD-600 127 Div. 8
OTS Price $1.60

Erie Technological Products, Inc., Pa.
PRODUCTION ENGINEERING MEASURE FOR RESISTOR-CAPACITOR MICROELEMENTS FOR MICROMODULES.
Quarterly rept. no. 3, 28 Dec 63 - 27 Mar 64
by J. E. Schupp. 27 Mar 64, 14p
Contract DA36 039AMCO1479E

Unclassified report

Descriptors: (*Capacitors, Production), (*Resistors, Production), Modules (Electronic), Microminiaturization (Electronics), Jigs, Paint applicators, Life expectancy, Performance (Engineering), Resistance, Capacitance.

Presented is a brief description of the major accomplishments in the Resistor-Capacitor Microelement project. Status of Program: Monthly and quarterly reports were submitted per contract requirements. Manufacture of resistor-capacitor microelements for Contract item 1-1-1 (a), 1-1-1 (b), 1-1-1 (c) and 1-1-1 (d) is continuing. Design and fabrication of special tooling was completed. Test evaluation of sample printed resistors is continuing. Present state of the art indicates a change in power requirements and voltage rating for resistor-capacitor microelements. Revision of delivery schedule and modification of technical requirements was discussed. (Author)

AD-600 132 Div. 8, 25
OTS Price $1.50

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
DIFFRACTION OF ELECTROMAGNETIC WAVES BY A CIRCULAR APERTURE IN AN INFINITELY CONDUCTING PLANE SCREEN.
Research rept.
by J. Bazer and L. Rubenfeld. Mar 64, 50p, EM195
Contract AF19 604 5238, Proj. 5635, Task 563502
AFCRL 64 244

Unclassified report

Descriptors: (*Electromagnetic waves, Diffraction), (*Diffraction, Electromagnetic waves), Diffraction gratings, Rings, Integral equations, Functions, Electromagnetic fields, Propagation, Mathematical analysis.

Attention is focused chiefly on the low frequency end of the spectrum where the product ka of the wave number k and the aperture radius a is small. Transverse electric and transverse magnetic modal excitation appropriate to the cylindrical geometry of the problem is assumed. New integral representations of the solution corresponding to incident fields of this kind are presented. These representations, which involve a pair of unknown functions, are designed so as to automatically satisfy Maxwell's equations, the boundary conditions, the radiation condition and all but one of the edge conditions. The unknown functions are shown to satisfy a pair of integro-differential equations which follow directly from the representa-

Descriptors: (*Distribution theory, Electrical networks), (*Electrical networks, Synthesis), (*Circuits, Theory), Integral transforms, Functions, Series, Sequences, Numerical analysis.

A new dimension to the time-domain synthesis problem is proposed. In particular, the objective is to find a realizable signal that approximates a given distribution (i.e., generalized function). A solution is then presented, several convergence criteria are discussed, and some examples are given. A feature of the present technique is that, if the Laplace transform of the given distribution is known, the realizable approximating signal can be written down without any computation. It only requires values of the Laplace transform at various points in its region of convergence. The method also yields a convenient technique for visualizing those distributions that cannot be plotted. Since ordinary locally integrable functions are special cases of distributions, the technique is significant for the customary time-domain synthesis problem as well. (Author)

AD-600 246 Div. 8
OTS Price $0.75

Bomac Div., Varian Associates, Beverly, Mass.
NOISE SOURCE FOR MILLIMETER WAVELENGTH.
Quarterly progress rept. no. 2, 1 Oct 63-1 Jan 64
by Arnold M. Eklund. 1 Jan 64, 22p
Contract DA36-039AMCO3229E, Task 1G622001A055-04

Unclassified report

Descriptors: (*Noise generators, Millimeter waves), (*Millimeter waves, Noise generators), Test equipment (Electronics), Calibration, Gases, Noise, Sources, Waveguides, Standing-wave ratios.

The major portion of this period has been spent in the evaluation of the 3.2 mm. test equipment and the construction and cold test of both the hot load and the gas noise source geometry. All of the test equipment has been received, and in the most part determined to be operational. The silicon carbide hot load is matched to standard RG 99/U waveguide with a VSWR maximum of 1.05 at both 70.0 Gc and 94.0 Gc. The gas noise source preliminary design has both a cold and a simulated fired match, which varies from 1.3 to 2.0 in VSWR, depending on small changes in quartz diameter and thickness. (Author)

AD-600 262 Div. 8
OTS Price $5.60

Army Air Defense Engineering Agency, Fort Meade, Md.
COMPARATIVE ENGINEERING EVALUATION TEST OF THE 5J26 MAGNETRON AND THE 5J26 MODIFIED MAGNETRON.
by Ferris D. Garcia. Dec 63, 52p
Proj. 4070

Unclassified report

Descriptors: (*Magnetrons, Performance (Engineering)), Radar equipment, Electron tubes, Reliability (Electronics), Test equipment (Electronics), Tests.

The series of tests compared the performance of standard 5J26 magnetrons with that of modified 5J26 magnetrons with an ion pump and an improved tuning mechanism. The test vehicle was an AN/TPS-1D radar set which is the basic radar of the AN/FPS-36 family. The results of the evaluation tests showed a marked improvement of system performance with use of the 5J26 magnetron. The improved operational characteristics were particularly evident in the important areas of phase stability, frequency stability, constancy of RF power output, tube gas content, arc stability, and brevity of ageing time. The tests demonstrated superior qualities of the modified magnetron from the standpoint of performance and reliability. (Author)

AD-600 279 Div. 8
OTS Price $1.25

Microwave Associates, Inc., Burlington, Mass.
X-BAND SOLID-STATE DETECTOR/AMPLIFIER.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 63
by John J. Brule. 31 Dec 63, 43p
Contract DA36 039AMC03274E, Proj. no. 1G6 22001A056

Unclassified report

Descriptors: (*Detectors, Amplifiers), (*Amplifiers, Detectors), X band, Mixers (Electronic), Tunnel diodes, Parametric amplifiers, Transistors, Solid state physics, Miniature electronic equipment, Design, Intermediate frequency, Preamplifiers, Model tests.

Progress was made in the evaluation of several possible components and techniques that could be integrated into a miniaturized solid-state x-band detector amplifier. The major emphasis was placed on determining the pertinent characteristics of each component and evaluating its applicability to the program objectives. Two approaches to the design of a suitable mixer were evaluated. Measurements performed on a single-ended mixer employing a backward diode indicated that noise figures of about 9.0 db could be obtained with this technique. Additional circuit elements, a hybrid ring and an I.F. filter section, for use in a miniature strip transmission line mixer were completed and the electrical characteristics were encouraging. Attention in the area of I.F. pre-amplifiers was focused on the design, fabrication and test of an I.F. parametric amplifier circuit and evaluating solid-state pre-amplifier performance. An integrated receiver assembly consisting of a tunnel diode oscillator-mixer and a solid-state I.F. pre-amplifier was designed, fabricated and tested. This unit, which was constructed in a volume of 7 cubic inches (excluding connectors) exhibited an overall noise figure of 9.4 db.

AD-600 283 Div. 8, 26
OTS Price $0.50

Texas Instruments, Inc., Dallas.
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY.
Quarterly progress rept. no. 6, 1 Oct -30 Dec 63.
30 Dec 63, 10p
Contract DA36 039sc86730

Unclassified report

Descriptors: (*Transistors, Reliability (Electronics)), (*Quality control, Transistors), Production control, Engineering, Stresses, Tests, Military requirements.

Eleven hundred production planar devices have completed stress tests. Process engineering work during the quarter was concerned with sustaining engineering functions. (Author)

AD-600 290 Div. 8
OTS Price $0.75

Microwave Associates, Inc., Burlington, Mass.
BROADBAND SOLID-STATE SWITCHES.
Quarterly rept. no. 3, 1 Jan-31 Mar 64.
by R. Tenenholtz. 31 Mar 64, 21p
Contract NObsr89463, Proj. SR0080302, Task 9604

Unclassified report

Descriptors: (*Microwave equipment, Electronic switches), (*Semiconductor devices, Electronic switches), (*Electronic switches, Broadband), Diodes, X-band, Capacitors, Coaxial cables, Transmission lines.

An analysis is presented on high power capability of broadband PIN diode switches and means of scaling performance from low power prototype designs. In addition, two basic broadband designs are described. Experimental data presented deals with blocking capacitor, DC-return, and bias T designs suitable for use over the 7 - 11 Gc range. In

AD-600 212 Div. 8, 22
OTS Price $1.10

Fairchild Space and Defense Systems, Syosset, N. Y.
DESIGN AND DEVELOPMENT OF INDICATOR MODULE MOD. 2 AND INTEGRATED MODULAR PROGRAMMER.
Monthly progress rept. no. 8, 1 Dec 63-1 Jan 64
by I. McRae. 1 Jan 64, 4p
Contract DA30 069AMC170A, Proj. OMS5520 12 442M
Unclassified report

Descriptors: (*Modules (Electronics), Design), Integrated circuits, Electronic equipment, Engineering, Ordnance.

AD-600 213 Div. 8, 22
OTS Price $1.10

Fairchild Space and Defense Systems, Syosset, N. Y.
DESIGN AND DEVELOPMENT OF INDICATOR MODULE MOD 2 AND INTEGRATED MODULAR PROGRAMMER.
Monthly progress rept. no. 9, 1 Jan-1 Feb 64
by I. McRae. 1 Feb 64, 3p
Contract DA30 069AMC170A, Proj. OMS5520 12 442M
Unclassified report

Descriptors: (*Modules (Electronic), Design), Integrated circuits, Electronic equipment, Engineering, Ordnance.

AD-600 216 Div. 8, 25, 30
OTS Price $3.60

PASTORIZA Electronics, Inc., Boston, Mass.
A SPECTRUM ANALYZER USING DIGITAL STORAGE.
Scientific rept. no. 1
by David C. Freeman and Herbert E. Miller Dec 63 33p
Contract AF19 628 467, Proj. 4691 Task 469102
AFCRL 64 336
Unclassified report

Descriptors: (*Spectrum Analyzers, Data Storage Systems), (*Magnetic Core Storage, Spectrum Analyzers), Filters (Electromagnetic Wave), Band-pass Filters, Narrowband, Resonance, Frequency, Digital Systems, Integrators, Differential Equations.

A spectrum analyzer was built with 256 separate filters using a core storage scanned at a 7 millisecond rate. The most useful feature of the digital spectrum analyzer is that the system clock frequency determines the resonant frequencies of the 256 individual filters. Analysis of the digital integrator, first order lag, and second-order filter shows that the center frequency Wn is 1/2 T sub D x square root of (A) and Q is square root of (A)/Z(A-2/3. T sub D is the time period at which a particular filter is sampled (also the time constant of the digital integrator) and (a) is the feedback factor in the digital first-order lag.

AD-600 224 Div. 8
OTS Price $1.60

Army Engineer Research and Development Labs., Fort Belvoir, Va.
THE PHOTO EFFECT IN SILVER-OXYGEN-CESIUM PHOTOCATHODES.
by P. G. Borzyak. 1964 15p
AERDL T1718 TT 64-15586
Unclassified report

Trans. of Akademyia Nauk URSR Kiev. Instytut Fizyky. Trudy, 1953, v. 4, p. 11-27.

Descriptors: (*Photocathodes, Photoelectric effects), (*Silver, Photocathodes), (*Oxygen, Photocathodes), (*Cesium, Photocathodes), Cathodes (Electron tubes), Films, Optical properties, Coatings, Adsorption, USSR.

An investigation was made of the photo effect, in relation to the optical properties, of dispersed films of silver coated with adsorbed films of cesium, complex oxygen-cesium films, and films of cesium oxide. The results of the experiments lead to the conculsion that the photo effect of the silver particles in a silver-oxygen-cesium cathode plays an important, and occasionally the principal role in the photoelectric emission of such cathodes. (Author)

AD-600 225 Div. 8, 25
OTS Price $2.60

Army Engineer Research and Development Labs., Fort Belvoir, Va.
THE OPTICAL AND ELECTRICAL PROPERTIES OF SILVER FILMS IN GLASS.
by P. M. Morozov and M. M. Butslov. 1964 24p
AERDL T1719 TT 64-15585
Unclassified report

Trans. of Zhurnal Tekhnicheskoi Fiziki (USSR) 1946, v. 16, no. 8, p. 857-878.

Descriptors: (*Photocathodes, Metal films), (*Silver, Metal films), (*Glass, Silver), Electrical properties, Optical properties, Vapor plating, Thickness, Resistance (Electrical), Electron microscopy, USSR.

The article is devoted to the following questions: (1) The simultaneous variation in the transmission coefficient and resistance of silver films on glass with increase in film thickness at different glass temperatures. (2) The transmission coefficient and the electrical properties of a silver wedge -- a film of variable thickness. (3) The spectral optical properties of silver films of variable thickness, both prepared at different glass temperatures (90 K, 20 C, 150 C, 300 C) and heat-treated. (Author)

AD-600 231 Div. 8, 14
OTS Price $2.75

Amphenol-Borg Electronics Corp., Danbury, Conn.
RESEARCH ON R.F. COAXIAL CONNECTORS, BROADBAND, HIGH TEMPERATURE, RADIATION RESISTANT
Rept. for Jan 59-Aug 63
by William M. Zerlin. Apr 64, 139p
Contract AF33 616 6243, Proj. 4156, Task 415602
RTD, TDR63 4039
Unclassified report

Descriptors: (*Coxial cables, Waveguide couplers), (*Dielectrics, Materials), Radiofrequency cables, Broadband, Electrical insulation, Silicon compounds, Dioxides, Aluminum compounds, Oxides, Glass, Seals (Stoppers), Silver alloys, Magnesium alloys, Nickel alloys, Mechanical properties, Clamps.

A report is given on the study and development of piece parts and assembly techniques leading to, and including, development of improved coaxial connectors for operation up to 1500 volts peak in a 50 ohm characteristic impedance line under severe environments such as -65 C to +500 C. temperatures and nuclear radiation. Work resulted in the development of a connector design that passes operational capabilities at high temperatures and is radiation resistant. A materials study was made to investigate possible materials suitable to the objectives of the contract. Advances made in the various phases of development during the life of the contract are covered extensively in the report. (Author)

AD-600 236 Div. 8, 15, 30
OTS Price $1.50

New York State Univ., Stony Brook. Coll. of Engineering.
THE TIME DOMAIN SYNTHESIS OF DISTRIBUTIONS
Scientific rept. no. 3.
by A. H. Zemanian. 1 Feb 64, 56p NYSU CE19
Contract AF19 628 2981, Proj. 5628, Task 562801
AFCRL 64 191
Unclassified report

AD-600 317 Div. 8
OTS Price $1.75

Linde Div., Union Carbide Corp., Parma, Ohio.
DEVELOPMENT OF THIN ORGANIC ROLLED FILM CAPACITOR.
Progress rept. no. 3, 1 Jan-31 Mar 64
by D. J. Valley. 31 Mar 64, 66p
Contract NObsr89519, Proj. SR0080302ST9636,

Unclassified report

Descriptors: (*Capacitors, Production), (*Dielectrics, Films), Foils, Aluminum, Electric properties, Rolling (Metallurgy).

The objective of the program is to develop a capacitor, using ML-1 film as the dielectric, capable of 100 volt operation over the temperature range of -55 to 170C, which is twenty times smaller than equivalent CQ05 per MIL Specification MIL-C-19978B. The capacitor is to exhibit dissipation of .01%; insulation resistance of at least 15 ohm farads at 170C; temperature coefficient of less than 250 ppm/degreeC; 250% dielectric withstanding voltage; no capacitance shift with frequency; less than 5% change in capacitance after life test. (Author)

AD-600 332 Div. 8
OTS Price $0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
PROPOSAL FOR 7.75 - 8.35 kMcps DIPLEXER USING SIDE-WALL COUPLERS AND CUT-OFF GUIDE.
Group rept.
by J. A. Kostriza. 24 Apr 64, 11p LL 1964-22
Contract AF19 628 500,
ESD, TDR64 52

Unclassified report

Descriptors: (*Waveguide couplers, S-matrix), (*Amplitude modulation, Attenuation), Electromagnetic waves, Scattering, Dielectrics, Radio signals, Radar signals, Communication systems, Microwave networks, Waveguides.

A diplexer may be made using two side-wall couplers interconnected by cut-off guides. Isolation is controlled by the length of the interconnecting lines. A sample design is worked out for 7.75 - 8.35 kMcps in full- and half-height WR-112 guide. (Author)

AD-600 338 Div. 8, 22
OTS Price $0.50

Naval Ordnance Lab., White Oak, Md.
RF DESENSITIZED SWITCH.
by Richard J. Sanford. 3 Mar 64, 13p

NOL TR64 43

Unclassified report

Descriptors: (*Electronic switches, Radiofrequency), (*Radiofrequency interference, Sensitivity), Semiconductor devices, Avalanche diodes, Weapon systems, Circuits.

The RF desensitized switch is a pnpn switch especially designed to be insensitive to radio-frequency energy. This insensitivity results from an abnormally large gate RC time constant and from the use of a zener diode to apply a desensitizing bias in the presence of rf energy. The device is diffused into a silicon chip which may then be mounted in a number of different packages for a wide range of sizes and power capabilities. (Author)

AD-600 355 Div. 8, 26
OTS Price $3.60

Westinghouse Research Labs., Pittsburgh, Pa.
MATERIAL PROCESSING AND PHENOMENA INVESTIGATIONS FOR FUNCTIONAL ELECTRONIC BLOCKS.
Interim engineering rept. no. 6, 6 Dec-6 Mar 64.
by I. M. Mackintosh, 6 Mar 64, 31p
Contract AF33 657 9897,

Unclassified report

Descriptors: (*Materials, Processing), (*Miniature electronic equipment, manufacturing methods), (*Electrochemistry), (*Electron beams), Anodes, Oxides, Silicon, Electrolytes, Diodes, Transistors.

Contents: Electrochemical Techniques, Fabrication of Controlled High Resistivity N (+)-on-P Layers, Reproducibility of Diffusion Results, Fabrication of N (+) -on-P Diode Arrays, Silicon Phosphide Precipitates, Development of Boron-Doped Anodic Oxide Films, Electron Beam Techniques, Electron Beam Effects on Transistor Characteristics, Effects on Bipolar Transistors, Effects on Field-Effect Transistors, Possible Mechanisms for the beta Degradation, Treatments to Improve the Value of beta After Degradation, Programmed Interconnections.

AD-600 362 Div. 8
OTS Price $1.75

Conductron Corp., Ann Arbor, Mich.
NEW VOR COUNTERPOISE SYSTEM FOR REDUCTION OF SITING ERRORS.
Final rept.
by V. H. Weston, J. E. Clark, and F. M. Penar. Jan 64, 66p
Contract FA WA4665, Proj. 115 42D,
FAA RD64 47

Unclassified report

Descriptors: (*Loop antennas, Antenna radiation patterns), (*Antennas, Antenna configurations), (*Antenna radiation patterns, Loop antennas), Electromagnetic waves, Propagation, Site selection, Errors, Direction finding, Equations, Theory.

The analysis of the field pattern generated by an Alford loop above a circular counterpoise is treated quite effectively by replacing the fields of the Alford loop by those of a nearly equivalent circular loop, this being justifiable upon consideration of the frequency and dimension parameters involved. A detailed theoretical analysis results in an expression for the free space field pattern of a circular loop above a large counterpoise as a function of the following parameters: wavelength of transmitted energy, height of loop above counterpoise, and size of counterpoise. The expression holds for counterpoise, diameters large compared to wavelength. Experimental verification of field patterns was possible for all single and double loop configurations under consideration, including both small and large diameter counterpoise. The antenna elements employed were actual scaled versions of the operational Alford loops. Precautions in measurement technique, such as placement of microwave absorbant material were vital to obtaining good nulls in the multiple loop patterns. The multiple loop patterns present significant improvement in essential radiation characteristics over the single loop configuration and it is therefore felt that serious consideration should be given to use of the multiple loop configuration as a means of eliminating VOR bearing errors in areas containing undesirable geographic and man-made characteristics.

AD-600 364 Div. 8, 26
OTS Price $0.75

Midland Mfg. Co., Kansas City, Kans.
CR-(XM-44)/U: MODERATE PRECISION GLASS ENCLOSED CRYSTAL UNITS.
Quarterly progress rept. no. 6, 1 July-30 Sep 63.
by Robert Kinsman and Melvin Hammer. 30 Sep 63, 21p
Contract DA36 039sc86717

Unclassified report

addition, an improved insulated diode mount is described along with recent broadband high power performance at X-band on a prototype switch design. (Author)

AD-600 301 Div. 8, 26
OTS Price $2.75

Knights (James) Co., Sandwich, Ill.
STEP I COMPLETION REPORT FOR HIGH PRECISION CRYSTAL UNITS; 5,000 KC, RUGGEDIZED.
Oct 63, 127p
Contract DA36 039sc54699

Unclassified report

Descriptors: (*Quartz resonators, Production), (*Crystals, Aging (Materials)), Instruction manuals, Test methods, Quality control, Resonators, Frequency, Shock (Mechanics), Vibration, Heat treatment, Calibration, Crystal oscillators.

The design and manufacture of Crystal Type CR-(XM-7)/U (CR-71/U with minor exceptions) is described, including a process manual, and a discussion of measuring equipment and techniques. Characteristic aging data is given and discussed, with emphasis upon the possibility of predicting aging in six to eight days, together with an evaluation of the MIL-C-3098/49 specifications for aging. Retrace characteristics (behavior of frequency with reference to time after an interruption of oscillation and removal from the oven control) are described. Frequency stability vs. shock and vibration, and vs. orientation of the unit with respect to the force of gravity are discussed, with supporting data. (Author)

AD-600 302 Div. 8, 25
OTS Price $1.60

Microwave Associates, Inc., Burlington, Mass.
FEASIBILITY OF BEAM-PLASMA AMPLIFICATION OF MILLIMETER WAVES.
Quarterly progress rept. no. 4, 15 Nov 62-15 Feb 63.
by Paul Chorney. 15 Feb 63, 19p
Contract NObsr81206
NP 13776

Unclassified report

Descriptors: (*Microwave amplifiers, Plasma physics), (*Plasma physics, Microwave amplifiers), Millimeter waves, X band, Nitrogen, Argon, Xenon, Electron guns, Cathodes, Cermets, Test equipment.

Beam-plasma-amplifier experiments are described which are being performed with the metal-ceramic X-band study vehicle. Net gains of 30 db and greater have been obtained using a xenon plasma; experiments using argon, nitrogen and vacuum are also described. The life test performed on a hollow cathode gun has concluded, the total useful life of the gun being about 400 hours. More plasma density measurements have been performed on a mercury P. I. G. discharge with a Langmuir probe. The results show that plasma frequencies near 70 Gc have been obtained and that the radial density profile of the plasma is very uniform over a large center portion. The observations of anomalous diffusion in a magnetic field is also pointed out. The progress in the design of the 70 Gc beam-plasma-amplifier study vehicle is described. Results of cavity cold tests and tests on mica vacuum windows are outlined. A gun model has been contructed which is designed to deliver an .008 in. diameter electron beam. (Author)

AD-600 312 Div. 8
OTS Price $8.10

Watkins-Johnson Co., Palo Alto, Calif.
DEVELOPMENT OF A 100 KILOWATT L-BAND TWT FOR PHASED ARRAYS.
Final rept.
by M. V. Purnell. 13 Mar 64, 86p W J64 434R24
Contract AF19 628 500

Unclassified report

Descriptors: (*Traveling wave tubes, Design), (*Radar equipment, Traveling wave tubes), Electron guns, Electron beams, Cathode tubes, Circuits, L band.

The purpose of the program was to develop a gridded 100 kilowatt L-band traveling-wave tube suitable for application in phased array radar systems. A ring-bar circuit which operates at 23 kv was selected for use in this tube. A perveance 5 gridded solid electron beam gun was developed for this tube. The tube was focused using a solenoid, PPM and single reversal permanent magnet configurations. Power outputs in excess of 100 kilowatts were measured. Beam efficiencies in excess of 30 percent were also measured. The tube was constructed as a grounded cathode tube which required unique techniques for mounting the circuit, the anode, making connections to the circuit, and the development of an rf match to the circuit. (Author)

AD-600 314 Div. 8
OTS Price $0.75

General Instrument Corp., Newark, N. J.
WICK BURNER FOR THERMIONIC GENERATORS.
Rept. no. 1, 1 May 63-31 Jan 64
by C. Teleki. 31 Jan 64, 23p
Contract DA36 039AMC02236E, Task 1G6 22001A053 03

Unclassified report

Descriptors: (*Thermionic converters, Heating), (*Heaters, Thermionic converters), Energy conversion, Diodes, Simulation, Combustion chambers, Heat exchangers, Exhaust gases, Petroleum, Vaporization.

A basic burner model with a simulated flat diode of 2.86 sq cm area was designed, fabricated and tested. The design incorporates a non-pressurized, wick type gasoline vaporization system, and a heat exchanger for pre-heating the secondary combustion air by means of the hot exhaust gases. A number of different combustion chamber designs were tested to determine the optimum configuration. Difficulties encountered in measuring the diode heat flux led to the design and construction of an improved simulated flat diode. Tests performed on the improved burner model indicated a simulated emitter surface temperature of 1415 C at a heat flux of 51 watts/sq cm. (Author)

AD-600 316 Div. 8, 7, 25
OTS Price $2.75

Stanford Research Inst., Menlo Park, Calif.
DIELECTRIC THIN FILMS WITH INCREASED BREAKDOWN STRENGTH.
Final rept., 1 June 61-31 Mar 64
by Saul W. Chaikin and Gilbert A. St. John. 15 Apr 64, 138p
Contract DA36 039sc84760; Proj. SRI PMU3693

Unclassified report

Descriptors: (*Capacitors, Electrical properties), (*Dielectric films, Capacitors), (*Dielectrics, Capacitors), Electrodes, Electric currents, Cleaning, Silicon compounds, Monoxides, Magnesium compounds, Fluorides, Tensile properties, Tests, Thorium compounds.

Substrate surfaces were studied to determine blemish detail and contribution to capacitor failure. Best surfaces for capacitor construction resulted from drawn glass and flowed glaze. An adequate cleaning procedure is outlined. The first metal electrode must be specular. High substrate temperature and slow rate of evaporation contribute to rough metal films. MgF sub 2 dielectric gave poor reproducibility. ThF 4 dielectric had an average dielectric strength.

Several typical parametric amplifiers are presented and discussed. Information is included which may be of assistance to a systems designer who is weighing the merits of the parametric amplifier against some other amplifier in a system design. Several examples of system design are given. Finally, some recent experimental data are discussed which suggest that in the future the parametric amplifier will completely prevail over the maser. (Author)

AD-600 411 Div. 8
OTS Price $0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
RADAR SCATTERING FROM A CONDUCTING CONE-SPHERE.
Technical rept.
by J. H. Pannell, J. Rheinstein, and A. F. Smith.
2 Mar 64, 20p LL TR349
Contract AF19 628 500
ESD TDR64 37

Unclassified report

Descriptors: (*Radar, Scattering), Electromagnetic waves, Conical bodies, Reflection, Measurement, Theory, Wave transmission.

As part of an investigation of the radar backscatter properties of axisymmetric conducting shapes, a study has been made of backscattering by a cone-sphere. This body is comprised of a circular cone with a 25 degree included cone angle, terminated by a tangent spherical segment. Measurements of backscatter cross sections over all aspect angles are presented for wavelengths, in the range from one-tenth to twice the radius of the spherical segment. Comparison of measured values with theoretical predictions shows that satisfactory agreement is obtained for all aspect angles. (Author)

AD-600 434 Div. 8
OTS Price $1.25

Westinghouse Electric Corp., Elmira, N. Y.
STUDY OF FIELD ASSISTED PHOTOCONDUCTIVITY.
Technical documentary rept., 1 Apr 63-1 Apr 64.
by V. J. Santilli. Apr 64, 45p
Contract AF33 657 10703, Proj. 4156, Task 415605
AL TDR64 93

Unclassified report

Descriptors: (*Vidicons, Photoconductivity), (*Photoconductivity, Vidicons), Electron tube targets, Photoelectric materials, Dielectrics, Sensitivity, Electron beams, Tunneling (Electronics), Performance (Engineering).

The work reported here was undertaken to investigate the fabrication and performance of a Vidicon target which included a thin insulator layer. A model metal-insulator-semiconductor structure is postulated, to develop the mechanism of carrier conduction through the target. Storage photoconductors and thin layers of various dielectrics are chosen to explore some of the structure details. Performance data such as sensitivity and response time, is determined for the Vidicon targets. The results indicate that certain characteristics of the photoconductor are changed with the inclusion of an insulator, but these are not necessarily explained by earlier appeals to a tunneling mechanism. A vidicon target with high sensitivity and good response time is developed which may have many useful applications. (Author)

AD-600 443 Div. 8, 25
OTS Price $0.50

Harry Diamond Labs., Washington, D. C.
THE TATARSKIAN CORRELATION FUNCTION FOR ARBITRARY TURBULENCE CONDITIONS.
by W. J. Brinks. 25 Mar 64, 17p
Projs. 1A013001A039 and A0214
HDL TR1209

Unclassified report

Descriptors: (*Electromagnetic waves, Propagation), (*Atmospheric motion, Distribution), (*Statistical functions, Correlation techniques), Integrals, Numerical analysis.

In Tatarski's theory of wave propagation through a turbulent medium, a certain intractable integral has been evaluated numerically. This allows the computation of the cross-correlation of the logarithmic amplitude fluctuations at two spaced receivers, for any arbitrary turbulence distribution along the propagation path. The question of obtaining the turbulence distribution from a known cross correlation function, is also treated. (author)

AD-600 449 Div. 8
OTS Price $1.00

Microwave Research Inst., Polytechnic Inst., of Brooklyn, N. Y.
FIVE-REACTANCE BROADBAND COMPENSATION DESIGNS.
by Bernard Michael Albrecht, Jr. Jun 64, 37p
PIBMRI1218 64
Grant AF AFOSR453 63

Unclassified report

Descriptors: (*Microwave amplifiers, Noise (Radio)), (*Radiofrequency filters, Broadband), Microwave equipment, Capacitance, Band-pass filters, Electrical impedance, Transients, Damping.

The most detrimental factor to the high frequency response of an amplifier is the total parasitic capacitance that shunts the output terminals. In particular, this shunt capacitance causes serious distortion to the step response and the amplitude response of the amplifier. Nevertheless, considerable improvement of the high frequency response can be achieved by the addition of a filter to the output terminals. This report shows the design of such a filter having five reactive elements, and a constant voltage source with a finite internal impedance. The criteria for design and two-fold: Critically damped transient response and maximally flat amplitude response. The results of each design are compared graphically with an uncompensated reference obtained by letting each compensation element go to zero. These curves are indicated by the letter U. Also included in the results are the pole-zero plots of the transfer functions of each design. Finally, all figures are rounded off to four places and tabulated. (Author)

AD-600 460 Div. 8
OTS Price $1.75

Cruft Lab., Harvard Univ., Cambridge, Mass.
MATRIX REPRESENTATION OF MULTI-LOADED CIRCULAR LOOP ANTENNAS.
Technical rept.
by Keigo Iizuka. 18 Nov 63, 68p Cruft TR429
Contract Nonr1866 32, Proj. NR371 016,

Unclassified report

Descriptors: (*Loop antennas, Performance (Engineering)), (*Matrix algebra, Numerical methods and procedures), Multiple operation, Electrical properties, Tunnel diodes, Electric currents, Distribution, Mathematical analysis.

Studies are made of both the driving-point impedance and the amplitude and phase distributions of the current in a circular loop which is driven by an arbitrary number of delta-function generators and loaded with an arbitrary number of lumped impedances. The only restriction imposed in the present treatment is that the elements (either generator or load) are spaced at equal intervals of 2 pi/m b along the circumference where m is the total number of elements and b is the radius of the loop. The numerical calculations include loads with negative resistances in order to take account of loops loaded with an element like an Easki tunnel diode, with proper precautions against both self-oscillation and switching effects. A study of such precautions is to be considered separately. Extensive computations have been carried out for loops loaded with a single resistor at phi = pi or phi = pi/2 as well as loops with two resistors at phi = 2 pi/3 and -2 pi/3. The resistances used

Descriptors: (*Quartz resonators, Crystal holders), (*Crystals, Production), (*Crystal holders, Glass), (*Binders, Phenolic plastics), Seals (Stoppers), Resonators, Manufacturing methods, Tests.

The first set of engineering samples consisting of five crystals at each frequency were fabricated, tested and shipped. The glass sealing process was finalized and the step-by-step procedure is discussed. Various bonding cements were evaluated. The Bakelite cement was the only type which proved adequate on the basis of the initial tests. Designs and test data for the engineering sample crystals are listed. (Author)

AD-600 366 Div. 8
OTS Price $2.75

Hughes Aircraft Co. Culver City, Calif.
INFORMATION THEORETIC EVALUATION AND OPTIMIZATION OF ANTENNA SYSTEMS.
Scientific rept. no. 2
by G. O. Young and A. Ksienski. Mar 64, 132p
Contract AF19 628 333, Proj. 4600, Task 460006

Unclassified report

Descriptors: (*Antenna configurations, Optimization), (*Statistical analysis, Antenna configurations), (*Communication theory, Antennas), Performance (Engineering), Equations, Design, Mathematical analysis.

The need for statistical analysis and optimization in antenna systems is discussed. The antenna and microwave equipment back of the antenna terminals is still, by and large, designed by classical techniques without the use of statistical criteria. To eliminate this difficulty the antenna should be included as part of the overall system to be optimized. This is accomplished in this report by extending statistical concepts from the temporal domain into the space-time domain. Two statistical criteria are developed and their application illustrated by examples. The first criterion is the maximization of (space-time) information content and rate. The second criterion is the minimization of information content and rate in the error (deviation between desired and actual output). General conditions are derived which must be complied with by linear antennas in order to satisfy the above criteria. These criteria are applied to a comparative evaluation of reciprocal and nonreciprocal antenna systems, and the optimum antenna configurations derived for various signal and noise conditions.

AD-600 382 Div. 8, 26
OTS Price $1.00

Clevite Corp., Bedford, Ohio.
PRODUCTION ENGINEERING MEASURE FOR CERAMIC FILTERS.
Quarterly rept. no. 4, 30 Dec 63-29 Mar 64
by A. Lungo.29 Mar 64, 36p
Contract DA36 039AMCO1471E,

Unclassified report

Descriptors: (*Ceramic materials, Filters (Electromagnetic wave)), (*Filters (Electromagnetic wave), Ceramic materials), Modules (Electronic), Electrical properties, Quality control, Production.

Preliminary vibration tests were performed on a 1.75 Mc filter. The results are discussed. A micromodule package design has been completed. Difficulty encountered in meeting the volumetric requirement of the contract is discussed. Attempts to eliminate the spurious resonances in the 6.0 Mc resonators have not been successful. The ring electroding and spurious resonance problems encountered have delayed several phases of the contract. An investigation of these problems was initiated which is described and discussed. Requiring ring electrodes, the 4.3 Mc resonators are included in the investigation. (Author)

AD-600 384 Div. 8, 26
OTS Price $3.50

General Electric Co., Owensboro, Ky.
8519/Z-5267 CERAMIC TETRODE, 35 WATT MINIMUM AT 3,000 MC. PRODUCTION ENGINEERING MEASURE.
Final rept., 23 May 62-28 Feb 64
by Harold D. Miller. 28 Feb 64 247p
Contract DA36 039SC86735,

Unclassified report

Descriptors: (*Tetrodes, Ceramic materials), (*Manufacturing methods, Tetrodes), Production control, Quality control, Electrical properties, Specifications, Electron tubes.

Preproduction data is presented as submitted for preproduction approval. Pilot production data is presented with distribution curves and yield factors for the run. A copy of the specification is presented. Photographs of the types of grids acceptable for 8519/Z-5267 use are presented. Photographs of major equipment are presented.

AD-600 385 Div. 8, 30
OTS Price $0.50

Hughes Aircraft Co., Oceanside, Calif.
RESEARCH AND DEVELOPMENT OF TWO-COLOR DIRECT VIEW STORAGE TUBE WITH SELECTIVE ERASURE.
Interim development rept., 1 Jan-1 Apr 64
by P. P. Damon.Apr 64, 17p
Contract NObsr89452,Proj. SR00 80301Task 9459

Unclassified report

Descriptors: (*Storage tubes, Colors), (Display systems, Electron tubes, Phosphorescent, Electron guns, Design, Operation, Information retrieval.

A direct view storage tube is being developed which is capable of displaying stored information in either of two colors or in intermediate hues, and selectively erasing that information. The viewing screen consists of two phosphors. One occupies small areas in register with the storage-mask holes, while the other occupies areas surrounding the first. Color tubes were constructed with 150-line storage mesh. Data on these tubes show the green phosphor efficiency was good, but the red phosphor efficiency was exceptionally low. Target performance was normal and registration excellent, although the uniformity of color shift was affected by a moire effect. A higher-count collector mesh has been ordered to reduce this color moire effect. Investigation continues, with promising results, on methods for fabricating a color screen having a phosphor dot surrounded by a solid field of the second phosphor for improved light output and color uniformity.

AD-600 405 Div. 8
OTS Price $1.50

Naval Research Lab., Washington, D. C.
PARAMETRIC AMPLIFIERS AND UPCONVERTERS.
by Alan C. Macpherson. 5 May 64, 51p
NRL 6024

Unclassified report

Descriptors: (*Parametric amplifiers, Design), (*Diodes (Semiconductors), Parametric amplifiers), Noise (Radio), Gain, Bandwidth, Circuits, Capacitance, Equations, Theory.

There is a discussion of the fundamental principles of parametric amplification, and a quantitive treatment which is valid in the limit of very high Q diodes. Design formulas from the literature are given and discussed for the more practical case of finite Q diodes. An engineering discussion of noise in amplifying systems is presented, because the most important characteristic of parametric amplifiers and converters is low noise. Since the parametric amplifier is built up from a two-terminal negative resistance, it is qualitatively different from the conventional amplifier (such as the vacuum tube triode and traveling wave tube). For this reason some basic material on the properties of negative resistance amplifiers is included.

Descriptors: (*Cathode ray tubes, Analysis), Electron tubes, Performance (Engineering), Specifications, Test methods, Test sets, Tests.

This report outlines and provides a means of comparing the four basic methods of CRT testing now employed by the cathode ray tube industry. An analysis of each test method, its restrictions, limitations, and advantages are discussed along with the basic requirements for testing cathode ray tubes. These four methods are selected by a joint industry-government committee as possible test standards. They are: (1) Shrinking Raster Technique, (2) Schade Spatial Frequency Technique, (3) Line Profile and Single Slit Technique, (4) Double Line Trace Technique (Westinghouse Method). Five high resolution cathode ray tubes were subjected to the four methods of tests and the results indicated for comparison. The appendix gives a detailed description of the CRT Analyser designed and built by Data Corporation for performing the various tests described. (Author)

AD-600 521 Div. 8, 15
OTS Price $0.75

Rome Air Development Center, Griffiss AFB, N. Y.
THE SHIFT AND ADD PROPERTY OF MAXIMAL LENGTH BINARY SEQUENCES USING CYCLOTOMIC POLYNOMIALS.
by Jack K. Wolf, Robert G. McLaughlin and Frederick D. Schmandt. Mar 64, 24p
Proj. 4519, Task 451903
RADC TDR64 66

Unclassified report

Descriptors: (*Sequences, Pseudo-random systems), (*Polynomials, Number theory), (*Binary arithmetic, Sequences), Coding, Linear systems, Errors, Corrections, Communication theory.

A class of binary pseudorandom sequences called maximal length shift register sequences are known to satisfy a shift and add property. That is, if the sequence is shifted by K digits and added to itself, the resulting sequence is the original sequence shifted by R digits. This report presents a method for obtaining the parameter R for a given K and a given maximal length sequence. This procedure makes use of previously published tables and the factorization of cyclotomic polynomials over Galois Field Two. (Author)

AD-600 522 Div. 8
OTS Price $0.50

General Telephone and Electronics Labs., Inc., Bayside, N. Y.
STUDY OF FAILURE MECHANISMS IN HIGH-POWER RADIO FREQUENCY GENERATING DEVICES.
Technical documentary rept., 30 Oct 63-29 Jan 64.
by M. Friedman Axler and R. A. Hein. Apr 64, 20p
Contract AF30 602 3018, Proj. 5519, Task 551906
RADC TDR64 107

Unclassified report

Descriptors: (*Electron Tube parts, Reliability (Electronics)), (*Traveling-wave tubes, Reliability (Electronics)), Radiofrequency generators, Microwave generators, X band, Electrodes, Anodes (Electron tubes), Oxide cathodes, Sorption, Degasification.

The aim of the investigation was to determine failure mechanisms caused by residual gases in traveling-wave tubes and to study means of eliminating these gases in order to improve tube reliability. Medium-power X-band amplifiers were life-tested at a high duty factor and evaluated against tubes tested at a lower duty factor; a change in tube-processing appears to improve tube performance. Initial electrical and gas data are reported for other tube types. Gas ambient and sorption phenomena for oxide-coated cathode-anode subassemblies under operating conditions are presented. Application of the anode accelerating voltage causes desorption of hydrogen and hydrogenous gases; thus, the anode is a major source of hydrogen. (Author)

AD-600 530 Div. 8
OTS Price $0.75

Prevention of Deterioration Center, NAS-NRC, Washington, D. C.
PACKAGING OF ELECTRONIC EQUIPMENT FOR TRANSPORTATION IN VIBRATION ENVIRONMENTS WITH EMPHASIS ON SEAGOING VEHICLES.
by Hans Janecka. 9 Dec 63, 21p PDC S63 048, PDL50066

Unclassified report

Descriptors: (*Electronic equipment, Packaging), (*Containers, Degradation), Storage, Aging (Materials), Transportation, Vibration, Shock (Mechanics), Ships (Nonmilitary), Bibliographies.

A bibliography of packaging for electronic and other equipment.

AD-600 539 Div. 8
OTS Price $0.75

Cruft Lab., Harvard Univ., Cambridge, Mass.
THE ADMITTANCE OF BARE CIRCULAR LOOP ANTENNAS IN A DISSIPATIVE MEDIUM
Technical rept.
by R. W. King, C. W. Harrison, Jr., and D. G. Tingley.
5 Aug 63, 29p Cruft TR419
Contract Nonr1866 32, Proj. NR371 016,

Unclassified report

Descriptors: (*Loop antennas, Admittance), (*Admittance, Loop antennas), Performance (Engineering), Atmosphere, Numerical analysis, Antennas, Graphics.

The normalized input admittance of thin bare circular loop antennas is evaluated from the theory of T. T. Wu. Computations are made for loops in air and in an infinite homogeneous isotropic dissipative medium. A comparison is also made with Storer's theory of the loop. Numerical results are given in the form of graphs for several wire sizes and for loops up to 2.5 wavelengths in circumference. The properties of the medium are represented by the ratio alpha/beta in the range from zero (perfect dielectric) to one (good conductor); alpha and beta are the imaginary and real parts of the complex propagation constant k=beta - j alpha = omega square root of (mu (epsilon - j sigma/omega) where mu is the permeability, epsilon the dielectric constant and sigma the conductivity of the medium. (Author)

AD-600 543 Div. 8
OTS Price $1.25

Ventura Div., Northrop Corp., Newbury Park, Calif.
THE EFFECT OF SMALL IRREGULARITIES ON ELECTROMAGNETIC SCATTERING FROM AN INTERFACE OF ARBITRARY SHAPE.
by K. M. Mitzner. 15 May 64, 43p NVR3503

Unclassified report

Descriptors: (*Electromagnetic waves, Scattering), (*Perturbation theory, Electromagnetic waves), Surface properties, Geometric forms, Green's function, Wave transmission, Mathematical analysis.

A perturbation analysis is used to determine the effect of small irregularities on electromagnetic scattering from an interface between two media. The interface irregularities are replaced by approximate equivalent surface currents, and the field in space can then be found using the dyadic Green's function of the unperturbed problem. The approach is valid when the irregularity has small slope and amplitude small compared to the wavelengths and local radii of curvature. To facilitate applications, the theory of dyadic Green's functions is developed, and the necessary functions are given for some important geometries. (Author)

ranged from - 100 through 100 ohms; the sizes of the loops from beta b = 0.2 to 2.4, where beta is the real part of the propagation constant k. (Author)

AD-600 461 Div. 8, 25
OTS Price $3.00

Cruft Lab., Harvard Univ., Cambridge, Mass.
MODULATION OF THE LINEAR-OPTIC EFFECT AT MICROWAVE FREQUENCIES.
Technical rept.
by Robert A. Meyers. Nov 63, 200p Cruft TR433
Contract Nonr1866, Proj. NR372 012

Unclassified report

Descriptors: (*Light, Modulation), (*Microwave frequency), (*Optics, Linear systems), Microwaves, Propagation, Field theory, Quantum mechanics, Sidebands, Quantum theory, Modulators, Design, Theory, Traveling-wave tubes, Single crystals, Cavity resonators, Electric fields, Polarization, Dielectrics, Microwave equipment.

A series of novel experiments on modulators made of several crystals stacked along the light path was performed, taking advantage of the fact that the two axes perpendicular to the optic axis in KDP are not completely equivalent. By rotating one of a pair of such crystals 90 degrees about its axis the modulation could be enhanced or degraded, depending on the relative orientation of the fast and slow axes in the two crystals. These original experiments on inhomogeneous light modulators led to the design of a new type of travelling-wave-like light modulator. The properties of this device have been analyzed, and its feasibility has been demonstrated with a prototype configuration of three crystals. The theoretical discussion is based on a review of classical crystal optics and the conventional theory of the electro-optic effect, and includes both a simple approximate solution and a more rigorous iterative solution to Maxwell's equations for non-linear dielectrics. Finally, an explicit survey of the general problem of microwave modulation has been made, with consideration having been given to both physical mechanisms and their experimental realization. The implications and conclusions of the present experimental study have been presented in this context.

AD-600 465 Div. 8, 25
OTS Price $3.00

Cruft Lab., Harvard Univ., Cambridge, Mass.
SURFACE-WAVE PROPAGATION ALONG A FERRITE ROD.
Scientific rept. no. 3 (Series 3)
by T. F. Tao. 20 Mar 63, 155p
Contract AF19 628 2406; Proj. 5635; Task 563502
AFCRL 63 569

Unclassified report

Descriptors: (*Waveguides), (*Ferrites, Wave transmission), (*Propagation, Microwaves), Ferromagnetism, Magnetic resonance, Circuits, Magnetic fields, Intensity, Calibration, Measurement.

Three characteristics of the surface-wave mode are measured. The first is its guided wavelength (its phase velocity). The second is its attenuation in the direction of propagation. The third is the radial field distribution. The development of microwave ferrites is briefly reviewed. The state of the art and unsolved problems are presented. The experimental setup and its design are discussed. It consists of two parts. The first is concerned with the dc magnetic field; it includes the dc magnetic circuit, its magnetic supply and the field measuring instruments. The second is the microwave part which includes the surfacewave cavity, its microwave excitation circuits and the associated measuring equipment. The methods of measuring the three characteristics referred to above are first discussed separately. Next, the behavior of the surface-wave resonances are explained. Finally, this information is coordinated to provide an integrated picture of the procedure of measurement. The measured results are presented. These include the dc magnetic measurements, the measurements of the guided wavelength which are satisfactory and can be interpreted without ambiguities, the measurement of attenuation and of the radial field result. A theoretical calculation is made to check the measured guided wavelength. The whole study is reviewed. The significance of its success is evaluated. The possible ambiguities and false interpretations are pointed out. Finally, suggestions are listed for further continued research. (Author)

AD-600 486 Div. 8
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
DEVICE FOR THE REPRODUCTION AND MEASUREMENT OF SHORT TIME INTERVALS, UMPV-2.
27 Mar 64, 4p
FTD TT64 4 TT 64 11711

Unclassified report

Unedited rough draft trans. of an unidentified Russian mono. issued by Komitet Standartov, Mer i Izmeritel'nykh Priborov pri Sovete Ministrov SSSR [Moscow] 1962. 1p.

Descriptors: (*Time-interval counters, Design), (*Test equipment (Electronics)), (*Time, Reproduction), Chronographs, USSR.

The device, UMPV-2, is intended for the testing of apparatus which reproduce and measure small intervals of time. This device consists of a test bed, on which there are arranged two electronic chronometers of the type KhE-2, a short interval timer, and a ferro-resonance voltage regulator. During a test of apparatus for the measurement of short time intervals, the timer on the device delivers an electrical impulse which confines the short time interval of an assigned value. This interval of time is measured simultaneously by two electronic chronometers and the instrument under consideration. During the testing of interval timers, the timer of the UMPV-2 device is not connected. The intervals of time, which are reproducible by the instrument under consideration, are measured by the chronometer units.

AD-600 510 Div. 8, 25
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PENETRATION OF PLASMA FROM A SOURCE WITH ELECTRON OSCILLATIONS TO AN EVACUATED REGION WITH A MAGNETIC FIELD.
by M. D. Gabovich and L. I. Romanyuk. 11 May 64, 15p
FTD tt64 400, TT 64 11710

Unclassified report

Unedited rough draft trans. of Zhurnal Tekhnicheskoi Fiziki (USSR) 1964, v. 34, no. 3, p. 488-495.

Descriptors: (*Plasma physics, Penetration), (*Electrons, Oscillation), (*Ion sources), (*Magnetic fields), Vacuum, Potential theory, Ions, Ionization, USSR.

The potential relief in a plasma emitted from a source with electron oscillations to an evacuated region located in a magnetic field was experimentally determined. The formation of fast ions and electrons emitted from such a source was examined. (Author)

AD-600 517 Div. 8, 30
OTS Price $2.50

Data Corp., Dayton, Ohio.
HIGH RESOLUTION CATHODE RAY TUBE EVALUATION.
Technical documentary rept., May 60-July 62.
Apr 64, 104p
Contract AF33 616 4206
ASD TDR63 796

Unclassified report

Descriptors: (*Tunneling (Electronics), Cathodes), (*Microwave amplifiers, Cathodes), (*Cathodes, Tunneling (Electronics), Metal films, Noise (Radio), Traveling-wave tubes, Stability, Life expectancy, Feasibility studies.

The work is aimed at investigating the feasibility of achieving low noise microwave amplification by using tunneling. At present it is possible to build tunnel cathodes that exhibit sufficient current density to permit their use in a traveling wave tube. However, the life of the cathodes under both continuous and pulsed operation is by no means satisfactory. For this reason the efforts are primarily aimed at investigating the life and stability of the devices. The experimental work consisted primarily of: (1) fabrication of tunnel cathodes using mainly methods developed in the previous contract, (b) investigation of the life and stability of these devices in continuous operation under both dc and ac conditions, and (c) investigations of the low noise properties of the tunnel cathode involving dc measurements near the threshold of emmission. (Author)

AD-600 595 Div. 8
OTS Price $0.75

Electron Physics Lab., Univ. of Michigan, Ann Arbor.
RESEARCH AND DEVELOPMENT ON HIGH-POWER CRESTATRONS FOR THE 100-300 MC FREQUENCY RANGE.
Quarterly progress rept. no. 15, 1 Jan-1 Apr 64.
by G. T. Konrad and C. K. Rhee. Apr 64, 29p ORA03783 16P
Contract NObsr81403, Proj. SF0100 201, Task 9294
Unclassified report

Descriptors: (*Microwave equipment, Electron tubes), (*Electron tubes, Very high frequency), (*Electron guns, Electron tube parts), Electron beams, Trajectories, Focusing, Electrostatics, Oscillation, Standing-wave ratios, Gain.

A series of trajectory plots for a reduced diamter P sub mu = 20 gun is shown. A reasonably well-behaved beam throughout the gun region is obtained. The electrostatically focused tube using one of the improved P sub mu = 4.46 guns is seen to yield only fair transmission to the collector at reduced voltages. Some low-level oscillations appear to limit the transmission. The revised design of the 100-watt Crestatrons has resulted in a tube with sufficient gain and power output. Only very minor modifications in the design have been found to be necessary for the final tubes. (Author)

AD-600 604 Div. 8
OTS Price $0.50

Foreign Tech. Div. Air Force Systems Command, Wright-Patterson AFB, Ohio.
EFFECT OF SIGNAL SHAPE ON ITS DETECTION UNDER NORMAL CORRELATED NOISE.
by V. F. Nesmeruk. 11 May 64, 14p
FTD TT64 439, TT 64 11694
Unclassified report

Unedited rough draft trans. of Radiotekhnika i Elektronika (USSR) 1963, v. 8, no. 8, p. 1319-1325.

Descriptors: (*Communication theory, Signals), (*Radar signals, Optimization), (*Radio signals, Optimization), Detection, Noise (Radar), Noise (Radio), Background, Signal-to-Noise ratio, Matrix algebra, USSR.

Examination is made of the problem of optimal detection of a signal, yielding the maximum probability of detection during correlated noises. An example is given of Markovian noise. (Author)

AD-600 615 Div. 8, 5
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
DETERMINING THE SITE OF TRANSMITTERS FOR USW AND MICROWAVE RADIO COMMUNICATIONS WITH THE AID OF A TERRAIN MODEL, PART II.
by H. Weihrauch. 6 Apr 64, 15p
FTD TT64 30; TT 64-11705
Unclassified report

Unedited rough draft trans. of Nachrichtentechnik (German Democratic Republic) 1963 (v. 13) no. 3, p. 111-114.

Descriptors: (*Communication systems, Site selection), (*Radio transmitters, Microwave communication systems), (*Radio communication systems, *Terrain models), Electromagnetic waves, Propagation, Diffraction, East Germany.

AD-600 633 Div. 8
OTS Price $3.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
PCM/PS TELEMETRY SYSTEM TEST. TASK IV: LONG RANGE COMMUNICATIONS. PHASE 2 ADVANCED PCM/PS. ADVANCED R/V PROGRAM PLAN.
Final rept.,
by A. J. Machuta. 1 Aug 61, 39p R60SD66 4 2
Contract AF04 647 269
Unclassified report

Descriptors: (*Telemeter systems, Performance (Engineering)), (*Data transmission systems, Telemeter systems), (*Communication systems, Effectiveness), Simulation, Radio interference, Test equipment (Electronics), Test methods, Tests.

This report describes the method and results of testing a PCM/PS telemetry system, and the system performance capability under simulated conditions of doppler shift, adverse signal to noise ratios, and incidental phase inversion of the signal due to antenna pattern variations.

AD-600 645 Div. 8
OTS Price $1.00

Texas Instruments, Inc., Dallas.
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY
Quarterly progress rept. no. 4, 1Feb-30 Apr 63
30 Apr 63, 32p
Contract DA36 039SC86730
Unclassified report

Descriptors: (*Reliability (Electronics), Transistors), (*Transistors, Manufacturing methods), Epitaxial growth, Diffusion, Coatings, Cleaning, Surface properties, Evaporation, Welding.

Topics include: epitaxial growth control; surface preparation of substrates for growth; epitaxial continuity control; diffusion control to eliminate resistivity product problem; protective coating techniques for surface passivation; cleaning techniques to obtain optimum surface conditions for all fabrication processes; welding techniques for encapsulation and sealing; controlled formation of surface oxide for surface stabilization; protective inert coatings for surface stabilization; evaporation control; mesa and dice cutting; piece part incoming inspection procedures; post can stressing; and quality assurance testing.

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-600 547 Div. 8
OTS Price $2.00

Remington Rand Univac Div., Sperry Rand Corp., Philadelphia, Pa.
INVESTIGATION AND ANALYSIS OF CIRCUIT COMPLEXES.
Final rept.
1 Dec 63, 72p
Contract AF19 628 437, Proj. 4645, Task 464504
AFCRL 63 582

Unclassified report

Descriptors: (*Circuit interconnections, Maintainability), (*Computer logic, Malfuntions), Modules (Electronic), Failure (Mechanics), Corrections, Special functions, Simulators, Errors, Mathematical analysis.

The problem of fault diagnosis is considered in this report. The function it first expressed in terms of a two input NOR module, and then one obtains a decomposition tree for synthesizing all n-variable Boolean functions. The tree is obtained by expanding the function with respect to some number of variables. This tree enables one to simulate malfunctions and to obtain the equivalence classes of faults. An example illustrates the procedure in detail. The sum part of the full adder is also used as an example to show the process of fault isolation, and the self-repair capability. The report then considers the use of multiple input NOR modules and the full adder is used to illustrate the advantages of using such modules. Here the expansion of the function is with respect to more than two variables at a time. The final section discusses the optimal number of variables about which to expand the function. (Author)

AD-600 555 Div. 8
OTS Price $1.75

Landsdale Div., Philco Corp., Pa.
RESEARCH AND DEVELOPMENT TO OBTAIN SEMICONDUCTOR JUNCTION MIXER DIODES FOR COUNTERMEASURES EQUIPMENT.
Interim engineering rept. no. 3, 1 Jan-31 Mar 64.
31 Mar 64, 68p Philco H102
Contract NObsr89420, Proj. SS021 001, Task 9030

Unclassified report

Descriptors: (*Microwave equipment, Diodes (Semiconductor)), (*Diodes (Semiconductor), X band), (*Tunnel Diodes, X band), Crystal mixers, Silicon, Germanium, Aluminum alloys, Aoise (Radio), Epitaxial growth, Etched crystals, Waveguides, Coaxial cables, Countermeasures.

Microplanar and micromesa tunnel diodes for X-band application were fabricated in both germanium and silicon. The most practical approach to the goal of low noise and high resistance to burnout is the germanium micromesa structure, modified to reduce the mesa to a height equal to the alloy depth in the microplanar structure. The germanium micromesa structure has unity noise-temperature ratio and a burnout resistance greater than 6 ergs, with over 20 ergs for many diodes. Noise figures of 8 to 9 db are readily attained. An aluminum-alloyed germanium micromesa structure with thermocompression-bonded contacts promises a higher temperature operating capability and greater resistance to burnout. Experiments with silicon included structures formed by local alloying, local epitaxial deposition, or alloying and etching. A ridged waveguide-to-coaxial mount for 7 - 11 Gc broadband operation was designed and fabricated. VSWR was designed at 1.2. (Author)

AD-600 557 Div. 8
OTS Price $1.60

Cooley Electronics Lab., Univ. of Michigan, Ann Arbor.
STUDY AND INVESTIGATION OF A UHF-VHF ANTENNA.
Bimonthly rept. no. 8, 3 Mar-2 May 64.
by J. E. Herman, S. B. Rhee, A. I. Simanyi, and D. E. Oliver.
May 64, 14p ORA5549 9F
Contract AF33 657 10607,

Unclassified report

Descriptors: (*Slot Antennas, Design), (*Spiral Antennas, Design), (*Conical Antennas, Design), (*Ferrites, Antenna components), Very high frequency, Ultrahigh frequency, Antenna radiation patterns, Standing-wave ratios.

Extensions of the rectangular slot filled with ferrite and cavity backed were made. Experiments were performed in replacing certain rectangular prismatic regions with balsa wood in place of ferrite. The ensuing effects upon VSWR and radiation patterns were observed and reported. In addition numerous experiments were performed using a log conical spiral backed by an aluminum cylindrical cavity. Ferrite was placed in numerous locations and data were recorded for a variety of arrangements yielding very promising, although tentative, results. (Author)

AD-600 559 Div. 8
OTS Price $0.50

Microwave Devices Lab., Univ. of Utah, Salt Lake City.
CYCLOTRON WAVE DEVICES STUDY.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 63
by T. Kao, D. C. Watson, C. H. Durney, C. C. Johnson, and R. W. Grow. 31 Dec 63, 17p
Contract DA36 039AMC02372, Task IG6 22001A055 04

Unclassified report

Descriptors: (*Cyclotron waves, Microwave amplifiers), (*Microwave amplifiers, S band), Tests, Gain, Coupling circuits, Tuning devices, Space charges, Electron tubes, Electron beams, Focusing.

The S-band amplifier was tested. Good coupling to the beam was obtained by the use of double-stub tuners. The small-signal gain was low and appears to be sensitive to the d-c focusing conditions. The coupled-mode analysis, modified to account for space-charge and beam rotation, has shown that the coupling is quite complex, involving several cyclotron and synchronous idlers and longitudinal velocity and displacement modes. (Author)

AD-600 578 Div. 8
OTS Price $1.00

Litton Industries, San Carlos, Calif.
RESEARCH ON NOISE IN CROSSED-FIELD GUNS.
Quarterly rept. no. 3, 1 Jan-31 Mar 64.
by R. P. Wadhwa. 20 Apr 64, 33p
Contract NObsr 89546

Unclassified report

Descriptors: (*Microwave amplifiers, Electron guns), (*Electron guns, Design), Electric insulation, Beryllium compounds, Oxides, Noise (Radio), Wave transmission, Gain, Standing-wave ratios.

The design criteria for the low-noise crossed-field amplifier are discussed. The assembly drawing of the device is given and the various parts used in the device and their functions are discussed in detail. It is found that by selection of appropriate dimensions for the insulators (which withstand the sole-anode voltage) and the BeO parts (which provides sufficient cooling for the losses), reasonably good insertion-loss characteristics can be achieved. In noise figure calculations it is found necessary to consider the propagation of all the waves; consideration of the growing wave only yields values of calculated noise figure less than those obtained by considering all the waves. This difference depends upon the gain of the amplifier. (Author)

AD-600 589 Div. 8
OTS Price $1.25

Raytheon Co., Waltham, Mass.
HIGH FREQUENCY TUNNEL DEVICE STUDY.
by S. R. Steele and A. Starr. Apr 64, 47p
Contract AF30 602 3249; Proj. 5573; Task 557301
RADC TDR64 116

Unclassified report

AD-600 685 Div. 8, 2
OTS Price $0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
PARTIAL REFLECTIONS IN THE ATMOSPHERE AND LONG-DISTANCE PROPAGATION.
by Francois Du Castel, Pierre Misme, and Jean Voge.
22 Apr 64, 14p
RSIC 166 TT 64 11681

Unclassified report

Trans. of Annales des Télécommunications (France) 1958, v. 13, no. 7/8, p. 209-214.

Descriptors: (*Electromagnetic wave reflection, Atmosphere), (*Propagation, Electromagnetic waves), (*Atmosphere, Electromagnetic wave reflection), Atmospheric sounding, Refractive index, Optical instruments, France.

A brief outline of the theories capable of explaining the electric field observed at a great distance beyond the visibility is given. The conclusion that each theory is valid for a particular atmospheric model is arrived at. The results of measurements, made in France and abroad, which demonstrate the existence of layers characterized by abrupt variations of the index of refraction are given. These layers appear to exist permanently in all parts of the globe, but their characteristics vary with the meteorological situation. (Author)

AD-600 696 Div. 8
OTS Price $0.75

Aerospace Corp., Los Angeles, Calif.
CAPACITANCE-VOLTAGE DEPENDENCE OF ZINC-DIFFUSED GaAs p-n JUNCTIONS.
by L. W. Aukerman, D. F. Kyser and M. F. Millea.
1 Jun 64, 29p TDR269 4250 11 2
Contract AF04 695 269
SSD TDR64 42

Unclassified report

Descriptors: (*Transistors, Impurities), (*Gallium compounds, Arsenides), (*Single crystals, Gallium compounds), Diodes (Semiconductor), Impurities, Zinc, Capacitance, Voltage.

The capacitance-voltage behavior of zinc-diffused GaAs p-n junctions indicates a severe non-linearity of the impurity distribution near the junction. This is probably due to the non-Fickian nature of zinc diffusion in GaAs. The capacitance of zinc-diffused GaAs p-n junctions varies as Coc V .1/n where the n values range from 2, as for an abrupt junction, to 3, as for a linear gradient junction. The capacitance-voltage relations for two assumed zinc profiles are calculated and compared with experimental results. A linear gradient on the p-side and a constant donor concentration equal to the starting donor concentration on the n-type side are found to be a good approximation of the actual impurity distribution at a zinc-diffused p-n junction. (Author)

AD-600 701 Div. 8
OTS Price $0.50

Microwave Associates, Inc., Burlington, Mass.
SOLID-STATE RF GENERATOR.
Quarterly progress rept. no. 3, 1 Dec 63-29 Feb 64
by F. P. Collins. 29 Feb 64, 10p
Contract NObsr89356, Proj. SR008 03 01, Task 9391

Unclassified report

Descriptors: (*Microwave equipment, S band)(*Radio-frequency generators, Semiconductor devices), (*Semiconductor devices, Radiofrequency generators), Transistor amplifiers, Radiofrequency oscillators, Varactor diodes, Frequency multipliers, Broadband.

Since the availability of the RCA TA 2307 transistor, a more efficient broadband S-band source may be designed by amplifying at 500 Mc. The decrease of the number of multiplier stages by using this approach will ease the bandwidth requirements. An LC oscillator operating at 500 Mc with a stability of greater than 1 part in 10,000 is readily achievable. By increasing the overall DC to RF efficiency of the source, the critical thermal problems normally encountered in a high power transistor amplifier are decreased. (Author)

AD-600 708 Div. 8, 26
OTS Price $1.25

Lockheed Missiles and Space Co., Sunnyvale, Calif.
PRINTED CIRCUITS AND WELDED MODULES 1963: AN ANNOTATED BIBLIOGRAPHY.
Special bibliography.
comp. by Jack B. Goldmann. Dec 63, 45p LMSC3 35 64 2, SB64 2
Contract AF04 647 673

Unclassified report

Descriptors: (*Printed circuits, Bibliographies), (*Microminiaturization (Electronics), Bibliographies), (*Bibliographies, Miniature electronic equipment), Circuits, Welding, Design, Production, Manufacturing methods, Abstracts.

The bibliography is a continuation of SB 63-17, Printed Circuits and Welded Modules: An Annotated Bibliography (1962) (AD-404 249). Microminiaturization of circuits and components as it is applied to manufacturing research, design standards and procedures; production methods and techniques and applications of the fabricated items were the subjects for which information was sought. The resources of Lockheed Missiles and Space Company Technical Information Center were utilized in the preparation of this bibliography. (Author)

AD-600 711 Div. 8, 25
OTS Price $1.50

Microwave Research Inst., Polytechnic Inst. of Brooklyn, N. Y.
WAVE PROPAGATION IN SINUSOIDALLY STRATIFIED DIELECTRIC MEDIA.
Research rept.
by T. Tamir, H. C. Wang and A. A. Oliner. 31 Jul 63, 56p
PIBMRI1185 63
Contracts Nonr839 28, AF19 604 7499

Unclassified report

Descriptors: (*Electromagnetic waves, Propagation), (*Propagation, Electromagnetic waves), (*Dielectrics, Wave transmission), Electromagnetic fields, Periodic variations, Modulation, Differential equations, Harmonic analysis.

The dispersion properties and the fields of electromagnetic waves are investigated for propagation in a stratified infinite medium. The stratification is characterized by a dielectric constant which, along one coordinate, is modulated sinusoidally about an average value. A systematic and comprehensive study is presented for the case of H modes for which the pertinent wave equation is in the form of a Mathieu differential equation. The modes and dispersion characteristics are analyzed in terms of a stability chart which is customary in the study of the Mathieu equation. Results are obtained for an unbounded medium, and a waveguide filled with the modulated medium; also, the reflection occurring at an interface between free space and a semi-infinite medium of this type is examined. In addition to these rigorous results for arbitrary values of modulation, simple analytical expressions are obtained for all of these cases when the modulation in the dielectric is small; it is shown that the fields are then expressible in terms of the fundamental and the two nearest space harmonics. The fields within a unit cell in the stratified medium are calculated for both small and large modulation and for frequencies up through the second pass band; it is of interest that the variation of the fields is not, in general, simply related to the variation of the dielectric constant within a cell. (Author)

Division 8 - ELECTRONICS AND ELECTRONIC EQUIPMENT

AD-600 651 Div. 8, 5, 6
OTS Price $3.00

Ohio State Univ., Columbus. Research Foundation.
HIGH GAIN ANTENNA REALIZATION AND TRACKING STUDY
Final rept., 1 Nov 62-Oct 63
Apr 64, 172p OSURF1072-7
Contract AF30 602 2166, Proj. 4519; Task 451901
RADC TDR64 72
Unclassified report

Descriptors: (*Antennas, Phased arrays), (*Tracking, Antenna configurations), (*Communication systems, Design), Gain, Communication equipment, Parabolic antennas, Systems engineering, Magneto-optic effect, Doppler effect, Feasibility studies, Radio communication systems.

The purpose of the work is to develop and optimize a technique for achieving high antenna gain for coherent communications without the inherent inflexibility of a single, large-aperture antenna. Pursuing this purpose the Ohio State University Research Foundation has designed and built an array of four, 30-foot diameter parabolic elements and associated combining and control equipment. The work in the past year has been a complete shakedown and alignment of the array, a definition of the experiments to be performed and the data to be recorded for each experiment. The data reduction equipment has also been installed, calibrated, and checked out for proper operation. A study has been made on possible uses of an array of high-gain elements for scientific purposes. Various methods of pattern control and an approach to a signal processing antenna have been studied. In addition, a photogrammetric method of measuring the surface contour of a parabolic antenna in operating position has been developed. The technique was used to measure one of the array elements and yielded an accuracy of 2 mm. (Author)

AD-600 652 Div. 8
OTS Price $1.00

Antenna Lab., Ohio State Univ. Research Foundation, Columbus.
APPLICATION OF ELECTROMAGNETIC ABSORBING MATERIALS AS INTERFERENCE REDUCTION TECHNIQUES.
Final engineering rept.
by Leon Peters, Jr., and Roger C. Rudduck. Apr 64, 35p
OSURF1423-7
Contract AF30 602 2711, Proj. 4540, Task 454001
RADC TDR63 549
Unclassified report

Descriptors: (*Antenna radiation patterns, Radiofrequency interference), (*Radiofrequency interference, Reduction), Horn antennas, Parabolic antennas, Luneberg lens antennas, Electromagnetic waves, Absorption, Materials.

Means of controlling undesired radiation of antennas for reduction of radio frequency interference are given for three antennas: the horn, the parabola, and the Luneberg lens. The radiation mechanisms of each antenna are obtained and used as a guide line for this reduction. A new approach for finding the diffraction by thick edges has been developed and is used to determine the radiation patterns of horn antennas. It has been shown that back radiation for the horn may be reduced by reducing the energy incident on these edges. Choke joints have been used for this purpose, and are proposed as a method for increasing the effectiveness of shielding screens. A method is given for creating nulls in the Fresnel zone of an antenna by use of a small amount of absorber material. (Author)

AD-600 666 Div. 8
OTS Price $1.25

Westinghouse Defense and Space Center, Baltimore, Md.
STUDY OF FABRICATION OF MICROELECTRONIC ASSEMBLIES FOR FREQUENCY AND TIME CONTROL SYSTEMS. PHASE II. A FEASIBILITY MODEL OF A MICROMINIATURE VLF/LF FREQUENCY SYNTHESIZER.
Interim development rept. 3, 1 Jan-31 Mar 64.
31 Mar 64, 42p MDE3572
Contract NObsr87593, Proj. SR0080303; Task 9624
Unclassified report

Descriptors: (*Miniature electronic equipment, Circuits), Microminiaturization (Electronics), Models (Simulations), Low frequency, Very low frequency, Analog systems, Control systems, Films, Feasibility studies, Production.

The purpose of the contract is to design and fabricate a VLF/LF frequency synthesizer in microelectronic form. A single thread breadboard of this system was constructed and successfully operated. A portion of the system was fabricated in thin film form and performed as expected. Detailed specifications for the microelectronic circuits and interconnection of circuits to formulate modues were prepared and fabrication of the remaining microcircuits is in process. (Author)

AD-600 680 Div. 8
OTS Price $1.00

Westinghouse Electric Corp., Washington, D. C.
500 WATT SILICON POWER TRANSISTOR.
Quarterly rept. no. 3, 31 Jan-30 Apr 64.
30 Apr 64, 34p
Contract NObsr91001, Proj. SR0080304, Task 9347
Unclassified report

Descriptors: (*Transistors, Silicon) (*Silicon, Transistors), Design, Voltage, Encapsulation, Tests.

Physical models, evaluation methods and electrical measurements of secondary breakdown are presented. Design calculations and experimental results demonstrating high voltage capability and feasibility of fabrication are discussed. A detailed encapsulation design is presented. (Author)

AD-600 682 Div. 8, 12
OTS Price $1.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
SYNCHRONOUS RECEIVER STUDIES FOR RE-ENTRY VEHICLES.
Final rept. Task B-8.4
by H. T. Freestone. 18 Apr 61, 18p R60SD76
Contract AF04 647 269
Unclassified report

Rept. on Advanced Components and Techniques, and Advanced Re-entry Vehicle Program Plan

Descriptors: (*Re-entry vehicles, Synchros), (*Synchros, Phase-locked systems), *Phase-locked systems, Design, Synchronization (Electronics).

The program objective was to provide experimental and theoretical studies of advanced components and techniques for new and better systems for re-entry vehicles. Efforts were directed toward improvement in the sensitivity of the synchronous receiver - as used in the reception of the PCM/PS signal. In particular, the effort was concentrated in the area of the phase lock loop - a critical performance area of receiver sensitivity.

Descriptors: (*Antennas, Antenna radiation patterns), (*Antenna radiation patterns, Mathematical prediction), Antenna configurations, Electromagnetism, Synthesis, Functions, Mathematical analysis, Theory.

A general principle is presented which states that all of the properties of any planar antenna can be determined completely from any piece of its TE and TM partial pattern functions. The principle is based on the analytic properties of the pattern functions and on the fact that the aperture and pattern functions are related through the Fourier integral. It applies to much of antenna theory, transient as well as steady-state. An interesting application is an analytic extension of the classical Poynting vector method as a means for determining input reactance, in addition to radiation resistance, of an antenna from its radiation pattern. (Author)

AD-600 766 Div. 8, 5
OTS Price $1.25

Radiation, Inc., Melbourne, Fla.
REDUNDANCY REDUCTION DEVICE.
Final documentary rept., Jul 62-Apr 64.
5 May 64, 43p
Contract AF33 657 9210, Proj. 4335, Task 43352
AL TDR64 10
Unclassified report

Descriptors: (*Redundant components, Reduction), (*Telemetering data, Redundant components), Pulse modulation, Data transmission systems, Electronic equipment, Samplers, Data processing systems, Design, Analysis, Communication theory.

A study was conducted to establish and evaluate techniques for the reduction of redundancy in pulse code modulated (PCM) telemetry data. An experimental equipment was designed and fabricated to demonstrate one of the techniques developed in the course of the study. The equipment provides for processing up to four multiplexed segments of either real or simulated data (in a prescribed format) to determine the affect of redundancy reduction on the reconstructed data. Two general types of redundancy reduction techniques have been examined. The various techniques have been compared for their relative effectiveness in achieving a reduction in transmitted bit rate. It is concluded that the appropriateness of applying a particular technique depends upon the nature of the data, the initial sampling rate, and the use to which the data is to be put. More impertantly, the application of redundancy reduction should be considered as a part of a complete telemetry system design problem and not as a separate feature to be added to an existing system. (Author)

AD-600 769 Div. 8, 25
OTS Price $1.50

Electronic Communications, Inc., Timonium, Md.
DIODE, MILLIMETER WAVE TYPE MIXER (8.2MM).
Quarterly progress rept. no. 3, 1 Dec 63-29 Feb 64
by R. J. Bauer and J. W. Dozier. 30 Mar 64, 60p
Contract DA36 039AMC02347E, Proj. 1G6 22001A056
Unclassified report

Descriptors: (*Mixers (Electronics), Diodes (Semiconductor)), (*Diodes (Semiconductor), Mixers (Electronics)), (*Semiconductor devices, Diodes), Epoxy plastics, Bonding, Gallium compounds, Arsenides, Germanium, Tunnel diodes, Millimeter waves, Performance (Engineering).

Epoxy bonding of point contact diode junctions is described. Results are presented on the conversion loss and crystal noise ratio of gallium arsenide point contact diodes at 94 Gc with intermediate frequencies of .750, 2.15, and 2.80 Gc. The best conversion loss obtained is 4.7 db with a crystal noise ratio (IF = 2.8G) of approximately 1.6. A promising technique of anticipating mixer performance is described using a diode's dual I-V curve trace. Both RF and IF impedance data are presented over relatively large frequency ranges. The design features of a new 94 Gc mixer mount are outlined. Efforts are described for pulse forming gallium arsenide and germanium tunnel diodes to be used as mixers. To date the semiconductor materials have not been as heavily doped as required. (Author)

AD-600 770 Div. 8, 20
OTS Price $1.00

Harry Diamond Labs., Washington, D. C.
TRANSIENT RADIATION EFFECTS ON BASIC TRIODE AMPLIFIERS.
by Paul A. Trimmer. 24 Apr 64, 36p
Proj. 23100
HDL TR1197
Unclassified report

Descriptors: (*Triodes, Amplifiers), (*Amplifiers, Triodes), (*Radiation effects, Amplifiers), Transients, Voltage, Gamma rays, Neutron beams, Secondary emission, Electrical properties, Tests.

Transient radiation-effects data on basic triode amplifiers were obtained for gamma radiation exposure rates varying from 1 x 100000 to 1 x 10 to the 7th power r-sec(1-). The net effect of the interaction of nuclear radiation with the basic amplifiers is equivalent to introducing a current generator into the grid circuit. For a potted amplifier using a 12AX7 miniature tube with a plate potential of 250 v, this current is on the order of 5 to 8 x 10 to the minus 13th power amp-sec-r(1-). The neutron radiation, which accompanies the gamma radiation in a reactor, did not have any appreciable effect. The radiation facility and experimental techniques are discussed. Data are also given on leakage currents in the potting compound, glass envelope of the tube, mica spacers, and air. (Author)

AD-600 796 Div. 8, 7, 15
OTS Price $1.00

Carlyle Barton Lab., Johns Hopkins Univ., Baltimore, Md.
STATISTICAL PROPERTIES OF NOISE PULSES.
Technical rept.
by A. J. Rainal. Jun 64, 39p AF-109
Contract AF33 657 11029, Task 403601
Unclassified report

Descriptors: (*Noise (Radio), Statistical processes), (*Statistical processes, Noise generators), Theory, Probability, Measure theory.

This report presents some theoretical properties of noise pulses which are generated by a random process crossing a fixed threshold level. The random waveshapes of the noise pulses are determined solely by the underlying random process and the fixed threshold level. For an arbitrary threshold level, this report considers the durations of the noise pulses, the average pulse amplitude, the RMS pulse amplitude, the average pulse area, and the average pulse energy when the underlying random process is either a sinusoidal process, a Gaussian process, or the envelope of a Gaussian process. Some numerical results are presented in graphs. (Author)

AD-600 797 Div. 8
OTS Price $0.75

Cruft Lab., Harvard Univ., Cambridge, Mass.
TRANSIENT RESPONSE OF A CLASS OF RECTANGULAR LOOP ANTENNAS.
by Trilochan Padhi. 17 Oct 63, 23p Cruft TR-426
Contract Nonr1866 26, Proj. NR371 015
Unclassified report

Descriptors: (*Loop antennas, Transients), (*Rectangular bodies, Antennas), (*Transients, Loop antennas), Impedance matching, Performance (Engineering), Experimental data, Electromagnetic waves, Propagation, Transmission lines.

AD-600 715 Div. 8, 25
OTS Price $1.50

Microwave Research Inst. Polytechnic Inst. of Brooklyn, N. Y.
WAVE PROPAGATION IN SINUSOIDALLY-STRATIFIED DIELECTRIC MEDIA.
by T. Tamir, H.C. Wang and A. A. Oliner. 31 Jul 63, 54p
PIBMRI1184 63
Contracts AF19 604 7499, Nonr839 28, Proj. 4600, Task 46004
AFCRL 63 367

Unclassified report

Descriptors: (*Electromagnetic waves, Propagation), (*Propagation, Electromagnetic waves), (*Dielectrics, Wave transmission), Electromagnetic fields, Acoustics, Periodic variations, Plasma physics, Modulation, Differential equations, Harmonic analysis.

The dispersion properties and the fields of electromagnetic waves are investigated for propagation in a stratified infinite medium. The stratification is characterized by a dielectric constant which, along one coordinate, is modulated sinusoidally about an average value. A systematic and comprehensive study is presented for the case of H modes for which the pertinent wave equation is in the form of a Mathieu differential equation. The modes and dispersion characteristics are analyzed in terms of a stability chart which is customary in the study of the Mathieu equation. Results are obtained for an unbounded medium, and a waveguide filled with the modulated medium; also, the reflection occurring at an interface between free space and a semi-infinite medium of this type is examined. In addition to these rigorous results for arbitrary values of modulation, simple analytical expressions are obtained for all of these cases when the modulation in the dielectric is small; it is shown that the fields are then expressible in terms of the fundamental and the two nearest space harmonics. The fields within a unit cell in the stratified medium are calculated for both small and large modulation and for frequencies up through the second pass band; it is of interest that the variation of the fields is not, in general, simply related to the variation of the dielectric constant within a cell. (Author)

AD-600 722 Div. 8
OTS Price $1.75

SFD Labs., Inc., Union, N. J.
AXIALLY EXTENDED INTERACTION AREA INVERTED COAXIAL MAGNETRON.
Final rept. Feb 62 - Feb 63,
by P. du Fosse and F. A. Feulner. Oct 63, 64p SFD20F
Contract AF33 657 8290
RTD TDR63 4074

Unclassified report

Descriptors: (*Magnetrons, Electron tubes), (*Magnetrons, Microwave equipment), Design, Feasibility studies, Test equipment, Electrical properties, Frequency.

The report describes the areas of endeavor and results obtained on a twelve month feasibility effort directed toward high power generation at millimeter wave frequencies. Axially extended interaction in an ICEM coaxial magnetron was the means employed toward attaining this goal. The work was performed at 35 Gc. (Author)

AD-600 723 Div. 8
OTS Price $6.60

Electrical Engineering Research Lab., Univ. of Illinois, Urbana
ELECTRON BEAM PARAMETRIC CONVERTER.
by Carl Wang. Jan 64, 61p
Contract AF33 657 10224, Proj. 4156, Task 415604
AL TDR64 64

Unclassified report

Descriptors: (*Microwave equipment, Energy conversion), (*Electric power production, Electron beams), (*Electron beams, Electromagnetic fields), Frequency, Excitation, Electromagnetic waves, Field theory.

A method for the generation of coherent electromagnetic power at wavelengths from 1 to 2 millimeters through the excitation of a rectangular cavity by an electron beam is theoretically investigated by means of a field theory approach. Experimental studies at a wavelength of 7.55 millimeters which successfully demonstrate the method are described. A high energy (1 Mev) bunched electron beam, produced by a S-band rebatron is used. The eleventh harmonic frequency component of the beam is used as a variable reactive element. The beam, when deflected by a transverse field established by applied signal power, becomes an active element at a frequency equal to the sum of the beam harmonic frequency and the signal frequency. The power at this high frequency can be coupled out from the deflected beam by a fast-wave interaction between the periodic beam and a fast wave supported by a smooth structure. The experimental apparatus converts signal power at a frequency of 9.17 Gc to power at a frequency of 39.71 Gc with an output power of 2 to 3 milliwatts. The technique appears to be practical for the generation of wavelengths of 1 to 2 millimeters at power levels of 10 to 100 milliwatts using presently available components if the apparatus is skillfully designed. (Author)

AD-600 724 Div. 8, 26
OTS Price $1.50

CBS Labs., Stamford, Conn.
DEVELOPMENT OF PHOSPHOR SCREENS FOR HIGH RESOLUTION DISPLAY DEVICES.
Final rept., Mar 63 - Mar 64,
by P. F. Grosso. May 64, 53p
Contract AF33 657 10632, Proj. 4156, Task 415605
AL TDR64 94

Unclassified report

Descriptors: (*Fluorescent screens, Display systems), (*Display systems, Fluorescent screens), Phosphorescent materials, Electrophoresis, Resolution, Cathode ray tube screens, Glass, Colloids, Spectroscopy, Adhesion.

Suitable colloidal suspensions for depositing (P-15, P-16, P-24) phosphors electrophoretically were developed. Phosphor screens with resolutions exceeding 80 line pairs per millimeter were deposited cataphoretically on glass using intermediate zinc and magnesium coatings which were subsequently removed by physical or chemical means. Stable P-24 suspensions were developed which can be elutriated for over 80 hours. Chemical composition and spectral emission characteristics of the electrically deposited phosphors were found to be similar to the starting material indicating no changes were caused by the deposition process. Qualitative spectrometer and quantitative efficiency measurements indicate an increase in radiant efficiency for cataphoretic P-16 screens under electron excitation at low current densities. Electrical measurements also indicate that the mechanism of emission from cataphoretic P-16 screens is different from settled P-16 screens and other cataphoretic screens such as P-15 and P-24. (Author)

AD-600 765 Div. 8, 25
OTS Price $1.00

Radiation Inc., Melbourne, Fla.
ON A FUNDAMENTAL PRINCIPLE IN THE THEORY OF PLANAR ANTENNAS.
Scientific rept. no. 1,
by Donald R. Rhodes. 15 May 64, 31p
Contract AF19 628 4007, Proj. 4600; Task 460007
AFCRL 64 331

Unclassified report

The report covers the work in the third quarter in the development program to substantially improve the oxidation, etching and diffusion processes as they apply to Functional Electronic Blocks and other planar semiconductor devices. Work toward the final goal of an operating line based on the principle of continuous processing has proceeded through model test of basic design features to the design of prototype unmechanized machines in the first and second quarters; to the actual construction and testing of manually operated prototype machines during the third quarter. The third quarter work mainly involved the construction of machines that embody the basic process and mechanical configuration of the final operating line without its mechanization of parts feed. The emphasis was on obtaining early operational models of the basic machines so that evaluation and debugging might start before final design of the line is completed. (Author)

AD-600 863 Div. 8, 5, 25
OTS Price $2.75

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
SIGNAL PROCESSING BY INFINITE CLIPPING AND RELATED TECHNIQUES.
Final rept., 16 Aug 63-31 Mar 64
by Berry O. Pyron and Frank R. Williamson, Jr. 1 Apr 64, 127p
Contract DA49 092AR021

Unclassified report

Descriptors: (*Speech transmission, Amplitude modulation), Signal-to-noise ratio, Speech, Speech compression, Speech representation, Speech recognition, Intelligibility, Signals, Processing, Communication theory, Acoustics.

Infinite peak clipping was studied as a technique for processing speech and other signals. Current and past utilization of this technique was surveyed briefly, and limited experimental and theoretical studies were performed. A new explanation is advanced for the high intelligibility of infinitely clipped speech, and a technique is suggested for achieving an acceptable compromise between the improved resistance to noise or jamming (or, alternatively, reduction in transmitted power) provided by infinitely clipped speech with amplitude modulation, and the concomitant reduction in quality and voice recognition. A possible system for speech bandwidth compression using a signal obtained by infinite clipping is described, and results of simple experiments are given. Also described is a type of visual display which produces patterns on speech signals that tend to show high correlation with the spoken word and its enunciation, and low correlation with the particular voice speaking. Fields of application for the techniques discussed include: radio communication systems, antijamming measures, acoustic systems, speech bandwidth compression, speech therapy and training, automatic recognition of speech, doppler radar signal analysis, and analysis of phonocardiographic and other physiological signals for medical diagnosis. (Author)

AD-600 864 Div. 8, 26
OTS Price $0.50

Texas Instruments, Inc., Dallas.
PRODUCTION ENGINEERING MEASURES: TRANSISTOR RELIABILITY.
Quarterly progress rept. no. 6, 1 Aug-31 Oct 63
31 Oct 63, 11p TII 03 64 35
Contract DA36 039SC86730

Unclassified report

Descriptors: (*Transistors, Reliability), Silicon, Epitaxial growth, Reliability, Life expectancy, Temperature.

AD-600 865 Div. 8, 5, 25
OTS Price $0.50

Royal Inst. of Tech., Stockholm (Sweden).
ACOUSTIC SPECIFICATION OF SPEECH: STL ANNUAL REPORT 1963.
Technical (Final) rept.
by C. G. M. Fant. 25 Jan 64, 15p
Grant AF EOAR63 55,
AFCRL 64 26.

Unclassified report

Descriptors: (*Speech, Analysis), (*Acoustic properties, Speech) Spectrum analyzers, Verbal behavior, Speech recognition, Speech compression, Auditory perception, Speech transmission, Specifications, Communication theory, Sweden.

Emphasis was laid on speech analysis techniques and the correlation of data from cineradiographic and spectrographic studies. These studies permitted the presentation of a simple mathematical model for describing formant frequency variations as a function of vowel duration and consonantal context. Several investigations on speech perception based on stimuli generated by the OVE II synthesizer were undertaken. One series of experiments were concerned with the discrimination of small differences in the acoustic structure of synthetic vowels and stop consonant plus vowel syllables and the results have been related to the location of stimuli in the acoustic domain with respect to phonetic boundaries. Other experiments were undertaken for the purpose of studying tonal factors of importance for perception of Swedish word accent. A similar study was concerned with French intonation. A study of auditory matching of sustained vowels with two-formant synthetic sounds is reviewed. Results support the established concept of mean pitch of the upper formants of front vowels within the limitation of the experimental procedure. (Author)

AD-600 871 Div. 8, 25
OTS Price $1.25

Sperry Microwave Electronics Co., Clearwater, Fla.
DEVELOPMENT OF ADVANCED MICROWAVE COMPONENTS AND TECHNIQUES - PLANAR HEXAGONAL FERRITES AND DEVICES.
Rept. for 28 Sep-28 Dec 63
Apr 64, 46p
Contract AF30 602 2757, Proj. 4506, Task 450602
RADC TDR64 78

Unclassified report

Descriptors: (*Microwave equipment, Production), (*Ferrites, Dielectric properties), Yttrium compounds, Iron compounds, Garnet, Nickel compounds, Anisotropy.

Studies were made of the effect of various processing variables on the dielectric loss of the planar hexagonal ferrites. Loss tangents which are of the order of 0.02 are the most severe limitations of the materials. Linewidths of approximately 290 oersteds were obtained on the Cu0.75Zn 1.25 Y compound. Attempts at orienting the grains of cubic polycrystalline materials produced yttrium iron garnet with a linewidth of 18.5 oersteds, yttrium gadolinium iron garnet with a linewidth of 156 oersteds, and nickel ferrite ($NiFe_2O_4$) with a linewidth of 379 oersteds. Measurements and analysis of the application of planar hexagonal ferrites in isolator performance are reported. While the anisotropy field of the planar ferrite reduces the external field required for resonance, it is also shown to adversely effect some isolator characteristics. Measurements were made on both E and H-plane configurations. (Author)

This report presents experimental investigations on the transient response characteristics of rectangular loop antennas with one pair of sides of length much smaller than the cut-off wavelength of the measuring apparatus. An approximate theory is also presented which agrees quantitatively with the experimental results. (Author)

AD-600 807 Div. 8
OTS Price $2.00

Pioneer-Central Div., Bendix Corp., Davenport, Iowa.
FREQUENCY TEMPERATURE COMPENSATION TECHNIQUES FOR QUARTZ CRYSTAL OSCILLATORS.
Quarterly rept. no. 2, 1 Oct-31 Dec 63
1 May 64, 75p Bendix Pub3012 64

Unclassified report

Descriptors: (*Crystal oscillators, Quartz) Frequency, Temperature, Capacitance, Thermistors, Resistors, Circuits, Synthesis, Heat sinks.

Stray capacitance effects on TCXO design characteristics are discussed. The relationship of TCXO parameters and the effect of various parameters on the temperature compensation characteristics are discussed and related information supplied in graphical form. Thermistor-resistor network synthesis techniques are explained and examples are shown to illustrate the techniques. The Group I experimental TCXO's are described and the effect of heat sink materials are shown. (Author)

AD-600 821 Div. 8, 5, 12, 25
OTS Price $2.75

Hallicrafters Co., Chicago, Ill.
INFORMATION TRANSFER FUNCTIONS THROUGH PLASMAS.
Final rept.
Apr 64, 136p
Contract AF30 602 3069, Proj. 5579, Task 557904
RADC TDR63 548

Unclassified report

Descriptors: (*Re-entry vehicles, Plasma sheath), (*Plasma sheath, Re-entry vehicles), (*Communication theory, Plasma sheath), Communication systems, Space surveillance systems, Slot antennas, Stagnation point, Wave transmission, Errors, Probability, Signal-to-noise ratio, Signals, Electromagnetic pulses, Modulation, Degradation, Mathematical models, Functions.

The degradation in information content undergone by surveillance and communication signals transmitted through the plasma sheath was calculated for some specific re-entry conditions. A comparative analysis was made for all present day types of modulations assuming a flush mounted slot antenna located near the stagnation point of the re-entry vehicle and operating near, but above, the plasma frequency. The analysis is based on a transfer function which relates the space-time Fourier transforms of the antenna exciting field to the received radiation field. The end results, presented graphically in terms of both error probability and transinformation vs. input signal to noise ratio, are based on the calculated pulse distortion undergone by the signal as it traverses the plasma sheath. The results of the study point out that for the plasma model under consideration the performance of all modulated signals is degraded with the greatest degradation occurring for Amplitude Keying and the least degradation occurring for Phase Shift Keying. (Author)

AD-600 834 Div. 8, 1, 23
OTS Price $1.00

Electronic Systems Div., Fairchild Stratos Corp., Wyandanch, N. Y.
DESIGN AND DEVELOPMENT OF THE AN/ASG-21-T1 FIRE CONTROL SYSTEM TRAINER.
by R. Bruck. Oct 63, 33p
Contract AF33 600 42938
RTD TDR63 4191

Unclassified report

Descriptors: (*Aircraft fire control systems, Training devices), (*Training devices, Fire control systems), Aerial gunners, Bombers, Gunnery, Simulation, Malfunctions, Digital computers, Analog computers.

The AN/ASG-21-T1 Fire Control System Trainer provides a realistic physical and functional simulation of the fire control operator's station in the B-52H aircraft. The trainer provides the environment for training fire control operators in the normal and emergency procedures of operation of the AN/ASG-21 Fire Control System. The trainer is composed of three major assemblies: (1) Trainee Station, (2) Console Operator (Instructor) Station, and (3) Card Preparation Work Station. The Trainee Station employs an off-the-line AN/ASG-21 Control Indicator and a FCS control unit. Other equipments normally contained in the Fire Control Operator's Station aboard the B-52H are also provided. The Instructor's Station contains all of the electronics necessary to simulate the various video signals displayed on the FCS operator's radar indicator. It also includes a digital computer, power supplies, control circuits and facilities for remote monitoring of the trainee's performance. A Card Preparation Work Station is provided, consisting of work desk, card punch machine for punching IBM type digital programing cards and miscellaneous other data and equipment employed in the preparation of the cards. (Author)

AD-600 837 Div. 8, 30
OTS Price $1.75

Electron Physics Lab., Univ. of Michigan, Ann Arbor.
INVESTIGATION OF LARGE-SIGNAL TRAVELING-WAVE TUBES.
Quarterly progress rept. no. 6, 1 Oct-31 Dec 63
by G. T. Konrad and J. E. Rowe. Apr 64, 63p
Contract AF30 602 2834, Proj. 5573, Task 557303
RADC TDR64 108

Unclassified report

Descriptors: *Traveling-wave tubes, *Klystrons, *Noise (Radio), Theory, Nonlinear systems, Numerical analysis, Space charges, Electron beams, Velocity, Electric currents, Helixes, S band, Electron guns, Circuits, Microwave equipment, Coupling circuits, Radiofrequency power.

The two-dimensional analysis for large signal phenomena in traveling-wave devices and klystrons has been employed to obtain solutions to drift-space interaction phenomena. The velocity components and harmonic current components within an electron stream are presented. The nonlinear theory for the solution of large-signal phenomena in microwave devices by a density function method has been checked. The Langmuir diode has been used as a test case. The agreement with the known results for this geometry is excellent. The work on a tube using a helix-type slow-wave circuit with two successive step changes in the phase velocity near the output end of the tube is described. The initial results are summarized. Cold test data on the ring-and-bar tube in the presence of a conducting shield around the slow-wave circuit has been obtained. These results are presented in detail in the form of a series of curves. (Author)

AD-600 847 Div. 8
OTS Price $1.25

Westinghouse Electric Corp., Baltimore, Md.
CONTINUOUS PROCESSES FOR FUNCTIONAL ELECTRONIC BLOCKS.
Interim technical progress rept. no. 3, 1 Jan-31 Mar 64
Mar 64, 48p
Contract AF33 657 11204
ASD TDR8 133 3

Unclassified report

Descriptors: (*Semiconductor devices, Machines), Oxidation, Diffusion, Cleaning, Models (Simulations).

9. FLUID MECHANICS

AD-600 007 Div. 9, 26
OTS Price $0.50

Radio Corp. of America, Harrison, N. J.
PRODUCTION ENGINEERING MEASURE FOR TUBE TYPE 7587.
Quarterly progress rept. no. 7, 1 Dec 63-29 Feb 64
by W. Ackermann. 29 Feb 64, 19p
Contract DA36 039sc86732

Unclassified report

Descriptors: (*Electron tubes, Industrial production), (*Miniature electron tubes, Manufacturing methods), (*Industrial equipment, Design), Electrodes, Winding, Brazing, Vacuum pumps, Quality control, Tetrodes.

A detailed account is given of the problems, actions, and progress encountered in maintaining the operational efficiency of equipment for the production of Nuvistor tube type 7587. The report also describes the step-by-step events that occurred in preproduction testing. It is indicated that all the necessary steps have been taken to allow commencement of the production run. (Author)

AD-600 016 Div. 9, 14, 17
OTS Price $1.25

Hydronautics, Inc., Laurel, Md.
ON TESTING MATERIALS FOR CAVITATION DAMAGE RESISTANCE.
by A. Thiruvengadam and H. S. Preiser. Dec 63, 43p
Hydro TR233 3
Contract Nonr3755 00, Proj. NR062-293

Unclassified report

Descriptors: (*Cavitation, Damage) (*Erosion, Test equipment) (*Metals, Surface properties) Aluminum, Stainless steel, Molybdenum, Iron alloys, Castings, Time, Magnetostriction, Cold-working, Materials.

Recent experiments with a magnetostriction apparatus show that cavitation damage rate is time dependent. This is confirmed by an analysis of the experimental data obtained in various earlier investigations. There are four zones of damage rate with respect to testing time namely: (1) Incubation, (2) Accumulation, (3) Attenuation, and (4) Steady State. In the fourth, or Steady State Zone, the damage rate varies as the square of the amplitude of oscillation within the range tested for water at 80 F. The damage rate increases with frequency and then decreases with increasing frequency. The depth of liquid in the beaker, the beaker diameter and the depth of immersion of the specimen do not seem to affect the damage rate substantially. The average depth of erosion is independent of the diameter of the specimen. Based on these experimental results, certain recommendations are made for testing materials for cavitation damage resistance. (Author)

AD-600 021 Div. 9, 30
OTS Price $1.75

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
TECHNIQUE FOR SEVERE RADIATIVE AND CONVECTIVE HEATING ENVIRONMENTS FOR MATERIALS EVALUATION.
by N. S. Diaconis, H. E. Weber, and W. R. Warren.
Mar 64, 65p R65SD24
Contract AF04 694 222

Unclassified report

Presented at the Hypervelocity Techniques Symposium (3rd), March 17-18, 1964, Denver, Colorado

Descriptors: (*Test facilities, Heat transfer), *Atmosphere entry, Simulation, Materials, Ablation, Enthalpy, Aerodynamic heating, High temperature research, Superaerodynamics, Flight simulators.

A test technique is described for the study of the performance of heat protection materials for advanced atmospheric entry vehicles. A primary characteristic of the facility is the establishment of relatively severe test environments that simulate flight conditions in terms of gas composition, stagnation enthalpy, convective and radiative heat transfer rates, and material specimen response. Another important feature is the significant flexibility in test variables that can be achieved. (Author)

AD-600 042 Div. 9, 25
OTS Price $1.50

United Research Services, Burlingame, Calif.
DEFORMATION OF SOLITARY WAVES. PART II: SHOALING.
by N. R. Wallace. 5 May 64, 52p URS631 2
Contract Nonr3948 00

Unclassified report

Descriptors: (*Water waves, Deformation), (*Fluid flow, Potential theory), (*Partial differential equations, Fluid mechanics), Differential geometry, Conformal mapping, Integrals.

This report investigates the properties of a solitary wave treated as a subregion of some fixed domain. By specifying trial boundary values on this larger domain, the velocity potential of a solitary wave can be approximated. For each trial potential function compatible with the symmetry of the fluid particle flow of the solitary wave, a family of possible wave surfaces can be derived from the differential equation of the kinematic boundary condition. The dynamic condition for the free surface is used to select that surface which most closely approximates the physical wave. It is found that McCowan's equations for the steady-state solitary wave are equivalent, in this procedure, to a single dipole field in the geomstry of an infinite strip. The shape of the solitary wave undergoing deformation is obtained by mapping a generalized form of the kinematic condition from the domain of deformation to the infinite strip. The introduction of the Bergmann kernel function as a coefficient of the kinematic differential equation facilitates this transformation. This report also describes the application of the single dipole field approximation to the shoaling of a solitary wave on a 45 degree slope. Not only is the point of breaking determinable, but the entire continuous deformation of the solitary wave up to the point of breaking is accessible by the above method. (Author)

AD-600 066 Div. 9
OTS Price $0.75

Hydrodynamics Lab., Calif. Inst. of Tech., Pasadena.
MEASUREMENTS OF THE WATER SURFACE CONTOUR BEHIND A HYDROFOIL OF MODERATE ASPECT RATIO.
by J. Brentjes. Feb 64, 26p E110 4
Contract Nonr220 43

Unclassified report

Descriptors: (*Hydrofoils, Fluid dynamic properties), Wake, Configuration, Hydrodynamics, Tests, Aspect ratio.

An experimental program was carried out for the measurement of the water surface contour due to a submerged hydrofoil of finite span. Because of the hydrofoil downwash, the water surface has a rather pronounced depression in the form of a long, narrow trough which extends many chords aft the hydrofoil. When the trailing vortex cores becomes sufficiently close to the water surface depression, flash ventilation of the vortices and the entire upper surface has been observed to occur abruptly. The model used here was a hydrofoil with a NACA 16-206 section and a rectangular plan form, mounted on a NACA 16-006 strut. The hydrofoil has a chord of 3 inches and an aspect-ratio of 1.33. It was found that the length and depth of the surface depression, and the location of the trough

AD-600 875 Div. 8
OTS Price $1.25

Motorola, Inc., Phoenix, Ariz.
DETAILED STUDY OF DELETERIOUS EFFECTS ON SILICON TRANSISTORS.
Apr 64, 47p
Contract AF30 602 3244, Proj. 5519, Task 551906
RADC TDR64 111

Unclassified report

Descriptors: (*Transistors, Surfaces), (*Silicon, Transistors), Electrical properties, Electric currents, Oxides, Voltage, Gain, Static electricity, Contamination, Reliability.

Deleterious surface phenomena such as junction leakage current, junction breakdown voltage, current gain degradation, etc. observed on n-p-n. p-n-p silicon transistors insulated gate unipolar field effects transistors and surface controlled bipolar transistors are described in detail. The models fitting the surface phenomena observed are presented. Also brief discussion of application of surface phenomena are included. (Author)

AD-600 115 Div. 9, 15
OTS Price $1.75

Rensselaer Polytechnic Inst., Troy, N. Y.
THE NONLINEAR INTERACTION OF A FINITE NUMBER OF DISTURBANCES TO A LAYER OF FLUID HEATED FROM BELOW.
by Lee A. Segel. 14 Apr 64, 62p RPI Math Rep64
Unclassified report

Sponsored by the Office of Naval Research and the National Science Foundation.

Descriptors: (*Fluid mechanics, Temperature) Fluids, Stability, Heating, Perturbation theory, Mathematical analysis.

It is predicted that at a temperature difference a little less than that at which motion starts according to linear stability theory, a steady hexagonal convective pattern will develop from finite amplitude instabilities in a horizontal layer of fluid heated from below. This is because the first disturbances to start growing must be the triplet of two-dimensional 'rolls' which form angles of 60 degrees with each other and whose amplitudes and phases first fall in certain critical ranges. The growth of these disturbances stabilizes all other disturbances and is such that ultimately the right phases and amplitudes occur to give hexagonal cells. If the temperature difference is increased somewhat beyond its critical value, the hexagonal pattern becomss unstable and a two-dimensional pattern is predicted. 'Free-free' boundary conditions, a viscosity which varies with temperature, and a fixed disturbance wave-number are assumed in this extension of the work of Palm (1960) and Segel and Stuart (1962). Other theoretical results and some experimental results are compared with the present predictions. (Author)

AD-600 138 Div. 9
OTS Price $2.25

Naval Ordnance Test Station, China Lake Calif.
CIRCUMFERENTIAL PRESSURE DISTRIBUTION ON AN INCLINED BODY OF REVOLUTION.
by K. Okauchi. Apr 64, 99p
NOTS TP3406, NAVWEPS 8448
Unclassified report

Descriptors: (*Bodies of revolution, Angle of attack), (*Supersonic flow, Pressure), Wind tunnel models, Blunt bodies, Viscosity, Vortices, Equations, Vector analysis, Distribution.

A summary is presented of the results obtained from wind-tunnel tests of a blunt-nosed body of revolution on which the circumferential pressure distributions at various stations along the body were determined. An empirical equation for calculating the circumferential pressure distributions on the cylindrical portion of the body is developed and compared with the experimental data. (Author)

AD-600 144 Div. 9
OTS Price $3.50

Technische Hogeschool, Delft(Netherlands).
LINEARIZED THEORY OF TWO-DIMENSIONAL CAVITY FLOWS.
by Jan Albert Geurst. 3 May 61, 217p
Contract N62558 2269
Unclassified report

Descriptors: (*Fluid flow, Cavitation), (*Two-dimensional flow, Theory), Hydrofoils, Fluid dynamic properties, Fluid mechanics, Flat plate models, Perturbation theory, Boundary value problems, Series.

Contents: Symmetric wedge flow; connection between linearized theory and non-linear models; Linearized theory of partially cavitating hydrofoils; comparison of theory and experiment; Wall effects on a partially cavitating hydrofoil; Some investigations of a linearized theory for unsteady cavity flows; and Supercavitating hydrofoil in unsteady motion.

AD-600 155 Div. 9, 30
OTS Price $3.00

Douglas Aircraft Co., Inc., Long Beach, Calif.
DEVELOPMENT AND TEST OF A LABORATORY SYSTEM FOR SIMULATION OF AERODYNAMIC AND RADIATIVE COOLING OF STRUCTURES.
Technical documentary rept. 20 Jun 62-20 Aug 63
Apr 64, 196p
Contract AF33 657 8670, Proj. 1347, Task 134704
RTD TDR63 4235
Unclassified report

Descriptors: (*Cooling and ventilating equipment, Structures), (*Aerodynamic heating, Cooling), Coolants, Aerospace craft, Feasibility studies, Test facilities, Simulation.

Research was conducted to develop a controlled cooling system for laboratory simulation of aerodynamic and radiative cooling of structures. The report summarizes criteria that establish the requirements of the system, presents data and analyses on the most practical methods of implementing the system, shows the detail design features of a prototype system and includes the results of a test program to insure the performance and workability of a system that will be compatible with, and form an integral part of existing radiant heat facilities. The cooling system consists of high pressure air streams directed onto test structures and acting in conjunction with radiant heat from quartz heat lamps to provide controlled cooling at test temperatures up to 3000 F. A unique liquid 'injection' system provides for the high cooling rates of up to 20 Btu/sec-sq. ft. The entire system operates automatically, utilizing the existing function generation, thermal controller and thermocouple feedback equipment to full advantage. (Author)

AD-600 183 Div. 9, 15, 25
OTS Price $1.25

Aerospace Information Div., Washington, D. C.
THE APPROXIMATE CALCULATION OF THE LAMINAR BOUNDARY LAYER IN AN INCOMPRESSIBLE FLUID WITH HEAT TRANSFER AND MASS TRANSFER.
by Z. P. Shul'man. 1964, 50p
AID T64 23, TT 64 11667
Unclassified report

Trans. of an article from an unidentified Russian-language manuscript.

Descriptors: (*Laminar boundary layer, Numerical analysis), (*Incompressible flow, Fluid flow), (*Fluid flow, Heat transfer) Fluid mechanics, Partial differential equations, Integration.

A method is proposed for an approximate calculation of the laminar boundary layer in an incompressible fluid in which heat transfer and mass transfer are going on together. Formulas are derived which, for moderate velocities, concentrations, and temperature jumps, link the local coefficient of heat transfer and the wall temperature with the transverse flow of a substance. (Author)

AD-600 186 Div. 9, 12, 30
OTS Price $5.00

Bell Aerosystems Co., Buffalo, N. Y.
AERO-SPACE ENVIRONMENT SIMULATION SYSTEM (ASESS). VOLUME I. MASTER CONTROL PROGRAM AND PRESENTLY INCLUDED SUB-ROUTINES.
Final technical documentary rept., Vol. 1
Dec 63, 334p
Contract AF19 628 2847
ESD TDR63 659 V1
Unclassified report

Descriptors: (*Command and control systems, Simulation), (*Control sequences, Digital computers), (*Programming (Computers), Programming languages, Compilers, Satellites (Artificial), Detection, Tracking, Mathematical analysis.

bottom are well defined functions of the Froude number and of the ratio of chord-to-submergence depth. It was also observed that the distance between the trailing vortex core and the lowest points of the depression is an important parameter in effecting the onset of ventilating flow. This investigation covered a range of flow velocity, angle of attack, depth of submergence, and the flap angle deflection. (Author)

AD-600 068 Div. 9
OTS Price $2.25

Edo Corp., College Point, N. Y.
THE EQUILIBRIUM CONFIGURATION OF A TOWED HYDROFOIL-CABLE SYSTEM IN TWO-DIMENSIONAL STEADY TURNS.
by P. A. Pepper. 10 Jan 64, 93p EDO 5822
Contract Nonr3582 00

Unclassified report

Descriptors: (*Hydrofoils, Fluid dynamic properties), Towed bodies, Towing cables, Stability, Configuration, Hydrodynamics.

This report describes a method for calculating the equilibrium configuration of a cable-towed hydrofoil system when the entire system rotates (as a rigid body) with constant angular velocity in the plane of the towpoint motion, the bulk of the analysis applying to the case of massless elements (cable and hydrofoil). This is done by obtaining an explicit solution (first integral) for the differential equation for the cable curve, from which the cable arc length and polar angle can be obtained by quadratures relative to the radius vector. Owing to the indirect nature of this problem, i. e., the requirement of satisfying two boundary conditions at an initially unknown boundary point, solution of any given problem involves certain numerical calculations. The latter have been considerably facilitated by construction of a set of numerical tables for the principal non-dimensional quantities. Recommendations are made for extension of the present analysis, particularly to the case of steady turns involving three-dimensional cable configurations.

AD-600 097 Div. 9
OTS Price $8.10

Firestone Flight Sciences Lab., Calif. Inst. of Tech., Pasadena.
SUPERSONIC SEPARATED AND REATTACHING LAMINAR FLOWS: I. GENERAL THEORY AND APPLICATION TO ADIABATIC BOUNDARY LAYER-SHOCK WAVE INTERACTIONS.
Technical rept. no. 3
by Lester Lees and Barry L. Reeves. 4 Oct 63, 81p
Grant AF AFOSR54 63
AFOSR 64 0893, PB 165 272

Unclassified report

Descriptors: (*Laminar flow, Separation), (*Adiabatic gas flow, Boundary layer), (*Shock waves, Fluid dynamic properties), (*Supersonic flow, Laminar flow), Fluid flow, Velocity, Enthalpy, Pressure, Distribution, Moments, Theory, Differential equations, Reynolds number.

The report deals with laminar boundary layer-shock wave interactions in which the pressure rise generated in an external supersonic, inviscid flow is communicated upstream through the boundary layer, and thereby induces flow separation. In order to describe this phenomenon approximately, including the subsequent reattachment of the flow, an integral or moment method is utilized in which the first moment of momentum is employed, in addition to the usual momentum integral (zeroth moment). The theoretical calculations agree quite well with the adiabatic laminar boundary layer-shock wave interaction experiments of Chapman and Hakkinen at moderate supersonic speeds. A comparison between the calculations and the experimental results of Sterrett and Emery on the free interaction upstream of a forward facing step at M = 6.5 also shows good agreement up to the plateau. The highly-cooled laminar boundary layer-shock wave interaction is qualitatively similar to the adiabatic turbulent boundary layer interaction. The limitations of the two-moment method based on a one parameter family of velocity profiles are discussed and the role of a two-moment, two-parameter method such as Wieghardt's is examined briefly.

AD-600 098 Div. 9, 4
OTS Price $5.60

Naples Univ. (Italy)
GENERALIZED VELOCITY POTENTIAL EQUATION FOR PLURI-REACTING MIXTURES.
Technical note no. 5
by L. G. Napolitano. Aug 63, 52p IA103
Contract AF61 052 327
AFOSR 64 0885

Unclassified report

Descriptors: (*Gas flow, Chemical reactions), (*Thermodynamics, Gas flow), Fluid flow, Velocity, Matrix algebra, Equations of state.

The paper is concerned with the derivation and discussion of the velocity potential equation for steady linearized motions of gas mixtures in which any number k of independent reactions take place. In a first part a number of thermodynamic notions, of interest in the subsequent development of the analysis, are briefly recalled. The second part deals with the derivation of the generalized potential equation and with the analysis of its essential features. In a last part the limiting forms assumed by the potential equation when a number of reactions can be considered either frozen or in equilibrium are derived and discussed. Explicit expressions of the potential equation and of all other pertinent quantities for indicative cases of plane motions are listed in an Appendix. (Author)

AD-600 102 Div. 9
OTS Price $2.50

Notre Dame Univ., Ind.
ON HYDRODYNAMIC STABILITY OF TWO-DIMENSIONAL UNSTEADY INCOMPRESSIBLE LAMINAR BOUNDARY LAYERS.
by Kwang-Tzu Yang and Matthew D. Kelleher. Feb 64, 101p
UND TN64 22
Contract Nonr1623 11

Unclassified report

Descriptors: (*Incompressible flow, Boundary layer), (*Laminar boundary layer, Stability), Fluid dynamics, Boundary value problems, Theory, Partial differential equations, Iterative methods, Cylindrical bodies, Flat plate models, Stagnation point.

A linearized hydrodynamic stability theory for unsteady incompressible laminar boundary layers over arbitrary cylinders is described. Criteria based on the instantaneous rate of change of the disturbance energy are introduced. In order to apply these criteria to a given unsteady laminar boundary-layer problem, it is necessary to have a complete knowledge of the instantaneous disturbance-amplitude functions. It is found that these disturbance-amplitude functions are governed by a partial differential equation, which can be solved by a numerical iteration scheme. Successive iterations are then obtained by solving an inhomogeneous ordinary differential equation repeatedly at the same time instants. Two numerical examples are calculated. One deals with unsteady flow over a flat plate when the free-stream, initially steady, undergoes a step-wise change in its velocity to one and one-half times of its original value. The second example treats an unsteady stagnation flow with its free-stream velocity, initially again steady, undergoing deceleration first and then changing to acceleration.

AD-600 298 Div. 9, 10
OTS Price $3.60

Brown Engineering Co., Inc., Huntsville, Ala.
AN EXACT METHOD OF CALCULATING HEAT CAPACITIES AT HIGH TEMPERATURES AND APPLICATIONS IN GASDYNAMICAL RELATIONSHIPS.
Technical note
by Benno Walter and Hans Walter. Feb 64, 39p BrownEng R83,

Unclassified report

Descriptors: (*Rocket propellants, Exhaust gases), (*Exhaust gases, Fluid dynamic properties), Thermodynamics, Specific heat, High-temperature research, Gas flow, Equations of state.

Fundamental gasdynamical relationships at high temperatures are developed. The relationships differ from the classical formulations mainly in that the heat capacities as well as their ratios are no longer assumed constant but rather depend on the temperature. The presented methods are of specific applicability in propulsion by high energy propellants as well as by nuclear heated hydrogen. (Author)

AD-600 344 Div. 9
OTS Price $4.60

General Electric Co., Schenectady, N. Y.
HEAT TRANSFER TO FLAT PLATE IN HIGH-TEMPERATURE RAREFIED ULTRA-HIGH MACH NUMBER FLOW.
by H. T. Nagamatsu, J. A. Weil and R. E. Sheer, Jr. Jul 61
50p R61RL (2787C)
Contract AF04 647 269

Unclassified report

Descriptors: (*Hypersonic flow, Heat transfer), (*Heat transfer, Hypersonic flow), (*Flat plate models, Heat transfer), Shock waves, Metal plates, Hypersonic wind tunnels, Boost-glide vehicles, Re-entry vehicles, Space probes, High-temperature research. Aerodynamic heating.

An investigation was conducted in a hypersonic shock tunnel to determine the local heat transfer rates for a sharp leading edge flat plate. The free stream Mach number range was 7.95 to 25.1 with stagnation temperatures of approximately 2550 and 6500 R. For these temperature and Mach number conditions, the strong interaction parameter varied from 2.35 to 826. The corresponding Knudsen numbers, based on the ratio of the free stream mean free path and the leading edge thickness, varied from 0.38 to 85.5. The sputtered platinum heat gages were dynamically calibrated by passing a moderate strength shock wave across the gages and observing the change in resistance due to a step function temperature rise. By this method the gage characteristics were determined for the same pressure rises encountered in the test section.

AD-600 401 Div. 9, 25
OTS Price $3.00

Allied Research Associates, Inc., Concord, Mass.
NUMERICAL METHODS FOR COMPUTING THE DENSITY OF A RAREFIED GAS ABOUT A MOVING OBJECT.
Final Rept.
by Lee W. Parker. Mar 64, 156p
ARA F9221 4
Contract AF 19 628 2782 Proj. 4691 and 5633,
Task 469102, and 563306
AFCRL 64 193

Unclassified report

Descriptors: (*Plasma physics, Gas flow), (*Superaerodynamics, Numerical analysis), Programming (Computers), Gas ionization, Particles, Density, Electrostatics.

Two basic computer programs are presented for the computation of particle densities throughout the interior of a spatial volume in an arbitrary potential field. They are aimed at the general problem of computing the density distribution about an object moving through a gas, sufficiently rarefied that corrections for collisions are small or negligible. Two approaches have been designed for the collision-free potential problem, in which the potential is defined on a discrete mesh of spatial points, for numerical purposes. In one of the approaches, the densities are also defined on a mesh of points, and the whole space is correspondingly divided into discrete small volumes associated with the mesh points. The computation follows a large number of particles injected at an outer boundary surface and sums density contributions within the discrete volumes along the trajectories in proportion to the times spent in the volumes. Exploratory computer runs with zero potential in the present program indicate that a grid on the order of 100 points requires on the order of hours of IBM 7094 time to obtain accuracies within a few percent. The program is preliminary in that it is not efficient but would give correct answers in the limit of infinitely many trajectories. The other approach evaluates the integral of the local Boltzmann distribution function directly, by computing a triple sum of trajectories whose behavior is governed by the potential field. Runs made with this program in an arbitrary potential field defined by a mesh of points also yielded physically expected density distributions. The problem of collisional corrections in the case of a disc moving through a rarefied neutral gas is formulated. Methods for evaluating the collision integrals are discussed, based on the model of elastic spheres.

AD-600 422 Div. 9, 1
OTS Price $1.25

Adelphi Univ., Garden City, N. Y.
AN ASYMPTOTIC METHOD FOR DETERMINING THE LIFT DISTRIBUTION OF A SWEPT-BACK WING OF FINITE SPAN
by James K. Thurber. May 64,49p AGM114
Contracts Nonr3360 01 and AF49 638 446

Unclassified report

Descriptors: (*Airfoils, Lift), (*Lift, Distribution), (*Swept-back wings, Lift), Boundary layer, Mathematical analysis.

A description is given of the flow about a flat, swept-back, symmetrically shaped airfoil which is moving with constant velocity V through a perfect ideal fluid filling three dimensional space. (Author)

AD-600 455 Div. 9
OTS Price $0.75

California Univ., Los Angeles.
AN AEROSONICS BIBLIOGRAPHY.
Supplement no. 1
by Alan Powell and T. J. B. Smith. Apr 64, 23p
UCLA DE64 20
Contract Nonr233 62, Proj. NR062 229

Unclassified report

Descriptors: (*Bibliographies, Aerodynamic characteristics), (*Aerodynamic characteristics, Bibliographies), Fluid flow, Fluid mechanics, Aerostatics, Supersonic flow.

This supplementary bibliography contains available references to the open literature on aerosonics up to March 1964 which is not included in the main volume. The scope of the bibliography has been enlarged to include references to the fluid dynamics of supersonic jet flows. (Author)

AD-600 459 Div. 9, 25
OTS Price $0.50

Aerospace Corp., Los Angeles, Calif.
GENERAL RESEARCH ON THE CURVATURE AND TORSION OF AN ISOLATED VORTEX FILAMENT.
by Robert Betchov. 15 May 64, 20p ATN64 9231 4

Unclassified report

The results of the study and design of an Aero-Space Environment Simulation System (ASESS) in support of aero-space command and control are presented in this report. The primary objective was to design a system modeling, in real and fast time, the interactions of an array of space vehicles with the elements of the environment in which they exist; containing detailed flow diagrams in the FORTRAN computer programming language for implementation on any one of several large scale digital computers (the IBM 7030 being foremost). The system simulates an aero-space environment containing: cooperative and uncooperative close-earth orbital vehicles, ground based and spaceborne communications - telemetry systems, and ground based search and tracking radars. Furthermore, because of the dynamic nature of space simulation techniques, ASESS provides a basis for incorporating modification and change as new and improved techniques, both analytical and computer orientated, are developed. (Author)

AD-600 217 Div. 9,20
OTS Price $2.60

Plasma Lab., Columbia Univ., New York.
CONTINUUM RADIATION BEHIND A BLAST WAVE.
Rept. no. 5
by Robert A. Gross.Aug 63,29p
Grant AF AFOSR48 63;
AFOSR 5363; NP 13739
AF Unclassified report

Descriptors: (*Blast, Shock waves), (*Shock waves, Explosion effects), (*Plasma physics), Electron density, Gas ionization, Equations, Mathematical analysis, Theory, Radiation effects, Gas flow.

The principal results of idealized blast wave theory are presented and then extended to include the effects of ionization and radiation. The conditions required to maintain blast wave dynamic similarity with radiation are set forth. Electron density and continuum radiation are determined as a function of position behind a blast wave for the plain, cylindrical and spherical cases.

AD-600 230 Div. 9, 15, 30
OTS Price $2.00

Technical Military Planning Operation, General Electric Co., Santa Barbara, Calif.
INVESTIGATION OF DYNAMIC PROGRAMMING METHODS FOR FLIGHT CONTROL PROBLEMS.
by E. L. Peterson and F. X. Remond, Sr. Mar 64, 79p
Contract AF33 657 10100, Proj. 8219, Task 821904
FDL, TDR64 11
Unclassified report

Descriptors: (*Dynamic programming, Flight control systems), (*Programming (Computers), Aerodynamic characteristics), Rocket propulsion, Optimization, Polynomials, Stochastic processes.

A discussion of dynamic programming and some of the closed form solutions which are derived along with a sample solution to a simple problem are used to introduce the method. Limitations and difficulties encountered using dynamic programming as a numerical technique are discussed before the investigation of methods for overcoming the difficulties are covered. The problem of finding optimal control for a thrusting vehicle is investigated using three approaches. First, the criterion of minimum squared terminal error with respect to a predetermined impact point is studied using polynomial approximation with Tchebicheff Polynomials to represent the return which is a function of three variables. Next, the minimum time intercept using a discrete return function representation is investigated. The return in this case is a function of two variables. Finally, a one dimensional stochastic problem is studied. The criterion chosen is the probability that the interceptor comes within a prescribed distance of the desired impact point.

AD-600 237 Div. 9
OTS Price $0.75

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PRINCIPLE OF TURBULENT MIXING OF COAXIAL FLOWS IN A CHANNEL OF CONSTANT CROSS SECTION.
by O. V. Yakovlevskii. 25 Mar 64, 21p
FTD TT63 1139, TT 64 11675
Unclassified report

Unedited rough draft trans of Inzhenernyi Zhurnal (USSR) 1961, v. 1, no. 4, p.39-50.

Descriptors: (*Gas flow, Turbulence), (*Turbulence, Theory), Fluid flow, Ejection, Pipes.

AD-600 248 Div. 9, 25
OTS Price $2.00

Illinois Univ., Urbana.
GAS-SOLID FLOW.
Technical rept.
by S. L. Soo. May 64, 80p ILL13P
Contract Nonr3623 00, Proj. NR098 038
Unclassified report

Report on Project Squid, presented at the Symposium on Single-and Multi-Component Flow Processes, Rutgers University, May 1, 1964.

Descriptors: (*Gases, Fluid dynamic properties), (*Solids, Fluid dynamic properties), (*Gas flow, Thermodynamics), Mass transfer, Turbulence, Laminar flow, Shear stresses, Fluid mechanics, Irreversible processes, Momentum, Laminar boundary layer, Flat plate models, Charged particles, Electrical properties, Nozzles, One-dimensional flow, Reviews.

Studies concern basic aspects of gas-solid suspensions: (1) Thermodynamic properties of a gas-solid system, additional irreversibility in momentum transfer, and the meaning of total pressure; (2) consideration of rigorous solution of problems of gas-solid flow and application of momentum integral method to laminar boundary layer motion to determine the velocity and concentration distribution of the solid phase with correlation in terms of a gas-solid momentum number, N sub m; (3) effect of electric charges on flow over a solid wall and correlation in terms of electric Reynolds number and a new electro-viscous number, N sub ev; and (4) effect of solid particles on mixing length of turbulence. (Author)

AD-600 258 Div. 9
OTS Price $0.75

Aerospace Information Div., Washington, D. C.
HEAT EXCHANGE OF A POROUS PLATE IN A GAS STREAM.
by N. N. Gvozdkov and E. P. Valuin. 1964, 28p
AID t64 24 TT-64 11668
Unclassified report

Trans. of mono. O Teploobmene poristoi Plastiny v Gazovom Potoke, Minsk, 1961, 16p.

Descriptors: (*Heat transfer, Porous materials), (*Porous materials, Heat transfer), Gas flow, Liquids, Heat, Distribution, Laminar boundary layer, Chemical reactions, Evaporation, Diffusion, Transformations.

Examination is made of the process of distribution of heat within a porous plate, accompanied by permeation by a liquid; then the equation of the laminar border layer is analyzed, taking into account the physico-chemical transformations and the diffusion of products of the reaction or of evaporation into the gas stream. Next the partial case of heterogeneous physico-chemical transformations is considered. (Author)

AD-600 524 Div. 9, 15
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio
APPROXIMATION METHOD OF COMPUTING THE THREE-DIMENSIONAL LAMINAR BOUNDARY LAYER.
by V. S. Avduevskii. 27 Mar 64, 12p
FTD TT63 1136; TT 64 11716

Unclassified report

Trans. of Akademiya Nauk SSSR, Otdelenie Tekhnicheskii Nauk. Izvestiya: Mekhanika i Mashinostroenie, 1962, no. 2, p. 11-16.

Descriptors: (*Laminar boundary layer, Numerical analysis), (*Three-dimensional flow, Laminar boundary layer), Boundary layer, Fluid flow, Fluid dynamic properties, Equations, USSR.

In the system of curvilinear orthogonal coordinates connected with the lines of flow of an ideal fluid on the surface of a body, and disregarding the secondary currents, a method is used analogous to the method of computing the axisimetrical boundary layer. There are proposed approximation expressions for the correction factor conciliating formulas obtained with the results of the numerical computations of the equations of the three-dimensional boundary layer on the lines of flow spreading. (Author)

AD-600 540 Div. 9
OTS Price $1.75

Polytechnic Inst. of Brooklyn, N. Y.
ASYMPTOTIC FLOW PATTERN OF A HYPERSONIC BODY.
by Roberto Vaglio-Laurin. Mar 64, 62p PIBAL805
Grant AF AFOSR62 409
AFOSR 64 0588

Unclassified report

Descriptors: (*Hypersonic flow, Blunt bodies), (*Blunt bodies, Hypersonic flow), Hypersonic characteristics, Equations, Mathematical analysis.

A theoretical investigation of the steady, continuum, inviscid flow pattern at large distances downstream of finite hypersonic bodies is presented. Specifically, blunt nosed plates and cylinders representative of actual bodies and associated wakes are considered. Asymptotic solutions are obtained for perfect gas flows at infinite Mach number. It is shown that: (a) the flows in question are not self-preserving (automodel); (b) asymptotic description thereof can be obtained by the method of matched expansions in conjunction with standard matching principles; (c) the asymptotic behavior of the bow shock is described by the law y=a sub ox(m) 1+a sub 1 x (N sub 1+... with the exponent m=2/(3+nu), in accord with the blast wave analogy, and the exponent N sub 1=-m(1+nu) (gamma-1)/gamma, gamma being the isentropic exponent of the gas. Considerations are qualitatively extended to the analysis of flows at large but finite Mach numbers; it is indicated that a general feature thereof is the appearance of secondary trailing shocks for both two-dimensional and axisymmetric configurations. (Author)

AD-600 574 Div. 9, 30
OTS Price $2.50

Engineering Projects Lab., Mass. Inst. of Tech., Cambridge.
VOID FRACTION MEASUREMENT.
by S. William Gouse, Jr. 13 Apr 64 102p DSR8734 2
Contract Nonr1841 73

Unclassified report

Descriptors: (*Fluid flow, Measurement), (*Measuring devices (Electrical and Electronic), (*Radiation measurement systems), Mixtures, Gases, Liquids, Photons, Radioactive isotopes, Nuclear industrial applications, Reviews.

One hundred and thirty-nine references on various methods of void fraction and film thickness measurement were reviewed and indexed by subject. Since the radioactive particle attenuation techniques were the most frequently employed method for measuring void fraction, these techniques were studied in detail. The conclusion of this detailed study is that accurate measurements of void fraction are feasible when small diameter, low and mono-energetic photon beams are employed. Such requirements generally will exclude the use of radioisotope gamma ray sources but will not exclude radioisotope beta-ray sources. Much of the published void fraction data using radioactive isotope sources is in error by ± 10% or more. (Author)

AD-600 590 Div. 9, 2
OTS Price $0.75

Brown Univ., Providence, R. I. Div. of Applied Mathematics.
ON THE INFLUENCE OF CORIOLIS FORCES ON ONSET OF THERMAL CONVECTION.
Technical rept. no. 54
by P. P. Niiler and F. E. Bisshopp. May 64, 22p
Contract Nonr562 07; Proj. NR062 179;

Unclassified report

Descriptors: (*Coriolis effect, Convection), Liquids, Viscosity, Thermodymanics, Fluid mechanics, Boundary value problems, Equations, Mathematical analysis.

The effect of Coriolis forces on the onset of thermal convection in a shallow layer of viscous liquid is studied in the limit of rapid rotation of the layer. The cases of both free and rigid boundaries are considered. (Author)

AD-600 591 Div. 9
OTS Price $1.00

Brown Univ., Providence, R. I. Div. of Applied Mathematics.
ON THE STRUCTURE OF WAKES AND WAVES. I. DEVELOPMENT OF INITIAL DISTURBANCES IN A NAVIER-STOKES FLUID.
Technical rept. no. 56
by Lawrence Sirovich. Apr 64, 31p
Contract Nonr562 07, Proj. NR062 179

Unclassified report

Descriptors: (*Sound waves, Partial differential equations), (*Partial differential equations, Fluid mechanics), Waves, Wake, Equations, Motion, Linear systems, Viscosity, Gas flow.

The solution to the initial value problem for the linearized Navier-Stokes equations is described. For times large compared with the time between molecular collisions in the gas and explicit form of the asymptotic solution is given. As a consequence it is shown that inviscid theory only appears as a nonuniform limit; that for very long times dissipation dominates the solution. For times large compared with the time necessary for a sound wave to traverse the extent of the initial disturbance an extremely simple asymptotic solution is obtained. This depends on only the gross properties of the initial disturbance. An argument is given which shows that only the leading term in the Navier-Strokes asymptotic expansion is accurate. (Author)

AD-600 592 Div. 9
OTS Price $1.50

Lockheed Missiles and Space Co. Sunnyvale, Calif.
INVISCID, NONADIABATIC FLOW ABOUT BLUNT BODIES.
Technical rept.
by K. H. Wilson and H. Hoshizaki. Jan 64, 54p
LMSC6-90-64-1

Unclassified report

Descriptors: (*Filaments, Vortices), Equations, Helixes, Deformation, Fluids, Motion, Perturbation theory.

The paper deals with the motion of a curved and isolated vortex filament immersed in an infinite, incompressible, and inviscous fluid. The filament is not necessarily plane; Attention is focused on its curvature and its torsion. These quantities vary with the position along the filament and with the time.

AD-600 476 Div. 9, 25
OTS Price $2.60

Institute of Tech., Univ. of Minnesota, Minneapolis.
SURFACE AND VOLUME SOUND FROM BOUNDARY LAYERS.
by William C. Meecham. 1963, 25p
Unclassified report

Descriptors: (*Turbulent boundary layer, Sound), Fluid dynamic properties, Boundary layer, Surface properties.

It is shown for turbulent boundary layers that surface, dipole sound is in general very much less than volume, quadrupole sound. This is so for two reasons: first, the relative volume sound is increased by several orders of magnitude because of shear-flow enhancement within the boundary layer. Secondly, the dipole sound intensity is shown, through the use of image argument similar to that used in the discussion of flat boundary layers, to be reduced by a factor of (L/R) squared where L is the boundary layer thickness and R is the surface radius of curvature. A discussion of irregular surface bumps shows that such imperfections may be the source of significantly large dipole sound. (Author)

AD-600 491 Div. 9
OTS Price $3.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
THE EQUATIONS OF MOTION IN A MULTICOMPONENT CHEMICALLY REACTING GAS.
Technical Information Series.
by Sinclaire M. Scala. 20 Dec 57, 38p R59SD205
Contract AF04 645 24,
Unclassified report

Aerophysics Operation Research Memorandum No. 5, formerly Aerophysics Technical Memorandum No. 36.

Descriptors: (*Fluid mechanics, Fluid flow), (*Boundary layer, Equations), Gases, Chemical reactions, Motion.

The general equations of motion for a multicomponent chemically reacting flow system are introduced. The concept of influscid flow is presented and the fundamental boundary layer equations appropriate for the analysis of the interaction between a flowing multicomponent chemically reacting gas and a surface are formulated for a typical coordinate system. (Author)

AD-600 498 Div. 9, 1
OTS Price $2.75

Lockheed-California Co., Burbank, Calif.
WIND-TUNNEL INVESTIGATION OF SINGLE AND TANDEM LOW-ASPECT-RATIO WINGS IN GROUND EFFECT.
by William D. Hinshaw and William E. Sickles. Mar 64, 123p Lock16906 Contract DA44 177AMC882T, Task 1D021701A04803
TRECOM TR 63 63
Unclassified report

Descriptors: (*Wings, Aerodynamic characteristics), (*Wind tunnels, Model tests), (*Ground effect, Wings), Aerodynamic configurations, Graphics, Equations, Data.

The effects of end-plate and camber changes on the aerodynamic characteristics of five basic wings in ground effect were investigated by the image technique, and the effect of gap-chord and aspect ratio was investigated on tandem-wing combinations over a ground board. For a given end-plate structural clearance height, the addition of end plates shows an increase in L/D for AR-1; however, better L/D is obtained with end plates off for AR-4. For a given wing trailing edge s structural clearance height, end plates show considerable improvement in L/D. Improved L/D is also noted for (a) small down flap deflection, (b) contoured end plates, (c) wedge-bottom end plates, (d) thin wing, and (e) high aspect ratio. Static stability improves as the ground is approached and is particularly evident for the tandem-wing combinations. Limited data were obtained in roll and yaw. (Author)

AD-600 499 Div. 9
OTS Price $2.50

Frost Engineering Development Corp., Denver, Colo.
VISCOUS MIXING OF TWO-DIMENSIONAL JETS WITH PARTICULAR REFERENCE TO JETS IN GROUND PROXIMITY.
by William E. Sickles. Apr 64, 111p Frost197 4
Contract DA44 177AMC71T, Task 1D021701A04814
TRECOM TR64 11
Unclassified report

Descriptors: (*Jet mixing flow, Two-dimensional flow), Fluid dynamic properties, Nozzle gas flow, Ground effect, Vortices, Viscosity, Equations, Graphics.

Existing jet mixing theory is reviewed and compared with available experimental results. Simple mixing equations are developed and used to determine the total pressure variation in a two-dimensional jet and the effect of a static pressure change on momentum flux. The effects of free-air entrainment are studied and potential flow solutions given for three particular cases. A method of calculating the lift loss due to vortices arising from viscous mixing is derived and gives good agreement with experiment. The effect of jet mixing on cushion pressure is investigated, using two approaches. The mixing equations are used to estimate total head loss in a recirculating jet and found to agree with experiment. The report concludes with some experimental observations of the static pressure distribution near a complex two-dimensional nozzle. (Author)

AD-600 502 Div. 9
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A CRUCIFORM WING OF FINITE SPAN IN A COMPRESSIBLE FLOW.
by B. I. Fridlender. 13 Apr 64, 9p
FTD TT64 127, TT 64-11724
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, 1963, v. 151, no. 6, p. 1299-1302.

Descriptors: (*Cruciform wings, Compressible flow), (*Compressible flow, Cruciform wings), Supersonic flow, Aerodynamic characteristics, Equations, Mathematical analysis, USSR.

The aerodynamic characteristics of a thin, cruciform wing consisting of four consoles of arbitrary geometric form are mathematical analyzed.

example is also computed at M = 22 and an altitude of 100,000 feet, in order to illustrate the behavior of the enthalpy distribution, and the behavior of the profiles of electron density in the wake in the two limiting cases of thermodynamic equilibrium and pure diffusion (zero recombination).

AD-600 663 Div. 9
OTS Price $0.75

Republic Aviation Corp., Farmingdale, N. Y.
RESEARCH INVESTIGATION OF HYDRAULIC PULSATION CONCEPTS.
Quarterly progress rept. no. 5, 1 Mar-31 May 64
by F. H. Pollard. 31 May 64, 25p RAC933 5, RD TR64 812
Contract AF33 657 10622, Proj. 8128, Task 812807
Unclassified report

Descriptors: (*Hydraulic systems, Simulation), Hydraulic models, Fluid dynamic properties, Analog computers, Diaphragms (Mechanical), Valves.

The fundamental objective of this program is to establish the technical feasibility of the transmission of hydraulic power through the use of pulsating flow and/or pulsating pressure concepts. In this reporting period, the final portion of the component design program is presented. A method is shown for fluid volume control signalling, using a diaphragm-type transformer. A diaphragm-following sensor is used so that no physical connection to the diaphragm is necessary. In the area of analytical studies, a comparison has been made of the effects of a reciprocating cylinder-type source of pulsating energy versus the conversion of continuous flow to pulsating flow by means of an alternator valve. Also studied were the effects of system components on the dynamic response of the system. An analog computer set-up has been completed; data is being taken to supplement and confirm the data obtained from the miniaturized pulsating system. A study of the usability of a wave form of pressure pulsation indicated that it would be unsuitable for power transmission. (Author)

AD-600 667 Div. 9, 30
OTS Price $1.60

Sciences Lab., General Electric Co., Philadelphia, Pa.
SHOCK TUNNEL EXPERIMENTAL TECHNIQUES FOR FORCE AND MOMENT AND SURFACE FLOW DIRECTION MEASUREMENTS.
by W. R. Warren, E. M. Kaegi, and R. E. Geiger. Oct 60, 11p GE Aerodynamics TM110
Contract AF04 647 269,
Unclassified report

Descriptors: (*Shock tubes, Test methods), (*Test facilities, Shock tubes), Model tests, Force (Mechanics), Moments, Aerodynamic characteristics, Measurement.

Two relatively new measurement techniques have been found to be useful in shock tunnel experimental studies. These techniques as they have been employed in the General Electric MSVD shock tunnel are described. A light-weight (cast Isofoam, generally from 1 to 5 grams in weight) model is suspended in the shock tunnel test section on thin (.5 - 1.5 mils) nylon strands. The strands break at the beginning of the test flow, and the model flies freely under the influence of the aerodynamic forces it experiences. The second shock tunnel experimental technique involves the generation of oil streak patterns on the surface of bodies subjected to the test flow. Such data are useful in heat transfer studies and in developing an understanding of complex three dimensional flows.

AD-600 692 Div. 9
OTS Price $1.00

RAND Corp., Santa Monica, Calif.
DECELERATION AND MASS CHANGE OF AN ABLATING BODY DURING HIGH-VELOCITY MOTION IN THE ATMOSPHERE.
by Carl Gazley, Jr. Apr 64, 38p, P2900
Unclassified report

Descriptors: (*Deceleration, Ablation), (*Ablation, Deceleration), (*Velocity, Motion), Fluid flow, Heat transfer, Thermodynamics, Drag, Atmosphere entry, Heat transfer coefficients, Hypersonic flight, Hypersonic flow, Superaerodynamics, Spheres, Transport properties, Aerodynamic heating.

The factors affecting the dynamics and mass loss of ablating bodies during high-velocity motion were examined. The classic meteor case, where the flow is assumed to be of the free-molecule type with constant heat-transfer and drag coefficients, was reviewed and presented in terms of general dimensionless parameters which allow application to cases other than that of meteor atmospheric entry. An analytic solution is obtained for the specific variation of the heat-transfer coefficient corresponding to a sphere with laminar convective heating in hypersonic flight at a constant altitude. The increase of heat-transfer coefficient due to decreasing body size (thus effectively increasing the efficiency) can result in a complete loss of mass during the deceleration process. For both cases, the velocity variation during the major part of the mass loss differs only slightly from that for a body with an unchanging ballistic coefficient. This approximation is used to formulate the analytic solution of a case which corresponds to the laminar convective heating of a sphere in hypersonic re-entry - i.e., a large slow meteor or fireball. Due to the dominant effect of the decrease in heat-transfer coefficient with increasing fluid density, the rate of mass loss is reduced and the final mass is appreciable compared to the initial mass.

AD-600 763 Div. 9, 15
OTS Price $2.00

Institut fur Struktur der Materie, Marburg (West Germany).
METHODS TO SOLVE THE EQUATIONS FOR FLUCTUATION PHENOMENA IN LOW DENSITY GAS.
Final technical rept., 1 May 63-29 Feb 64
by Gunther Ludwig. 29 Feb 64, 74p
Contract DA91 591EUC2918
Unclassified report

Descriptors: (*Gases, Oscillation), (*Fluid mechanics, Gases), Statistical functions, Moments, Relaxation time, Partial differential equations, Iterative methods, Integral equations.

AD-600 809 Div. 9, 30
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE LOCAL METHOD FOR DIRECT MEASUREMENT OF THE BOUNDARY-LAYER VELOCITY PROFILE OF A NONUNIFORMLY HEATED FLAT PLATE.
by Z. F. Siezenko. 27 Apr 64, 12p
FTD TT63 1053, TT 64 11662
Unclassified report

Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) 1962, v. 5, no. 10, p. 47-52.

Descriptors: (*Boundary layer, Flat plate models), (*Measuring devices (Electrical and Electronic), Design), Equations, Gas flow, Velocity, Curved profiles, Measurement, Fluid mechanics, USSR.

In this article are examined the theoretical principles of a measuring method, an equation for sensitivity of the measuring device, a method of calculating velocity from a nomogramm, the fundamentals of a local method for direct measuring of a velocity profile, and the principles of operating the experimental device. (Author)

Descriptors: (*Aerodynamic heating, Blunt bodies), (*Atmosphere entry, Aerodynamic heating), Gas flow, Thermal radiation, Shock waves.

The problem considered is that of determining the inviscid, nonadiabatic flow field which results when energy loss by radiation becomes significant. The approach taken is to include the radiation term in the energy equation and solve the resulting conservation equations for the flow past a blunt body. The direct blunt-body problem is solved using an integral method of solution. The flow field is determined in an iterative manner in which the shock shape from the previous iteration is used in the current iteration. Hence, in the final analysis, no a priori information about the shock shape is required. Results have been obtained for the flow about a sphere and a hemisphere-cone under conditions where large energy loss from the shock layer occurs. The nonadiabatic nature of such a flow was found to significantly reduce the shock layer thickness about the body and alter the enthalpy profiles within the shock layer. As expected, the radiative heating is reduced considerably from the adiabatic value for cases where large nonadiabatic effects are present.

AD-600 627 Div. 9
OTS Price $3.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
A DISCUSSION OF NESS'S ANALYSIS FOR A TURBULENT BOUNDARY LAYER WITH MASS ADDITION.
Technical Information series,
by G. K. Walker and B. A. Schumann. 1961, 37p R61SD49
Contract AF04 647 715

Unclassified report

Descriptors: (*Turbulent boundary layer, Numerical analysis), (*Fluid mechanics, Transport properties), (*Air, Injection), Heat transfer, Boundary layer, Thickness, Jet mixing flow, Laminar flow, Gas flow, Programming (Computers), Digital computers, Friction.

The governing equations of Ness's analysis of the turbulent boundary layer with air injection have been solved by means of a digital computer. The results of the calculations are presented for various free-stream and local conditions. The results of Ness's analysis for air injection are compared with experimental data, and agreement is seen to be poor. A comparison of Ness's theory with incompressible velocity profile data provides a possible explanation for the discrepancy. A comparison of Ness's analysis for helium injection and experimental data shows good agreement for zero to moderate injection rates, and poor agreement for high injection rates. Therefore, it is concluded that for the general case of a turbulent boundary layer with mass addition, extreme caution should be employed when applying Ness's analysis.

AD-600 628 Div. 9, 25
OTS Price $3.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
EFFECT OF ANGLE ATTACK ON LAMINAR CONVECTIVE HEAT TRANSFER ON SHARP AND BLUNT CONES.
Technical Information series,
by A. E. Heins and T. J. Estes. 26 Apr 61, 33p R61SD70
Contract AF33 600 41827

Unclassified report

Descriptors: (*Aerodynamic heating, Angle of attack), (*Angle of attack, Aerodynamic heating), (*Heat transfer, Geometric forms), (*Blunt bodies, Heat transfer), Fluid mechanics, Thermodynamics, Correlation techniques, Theory, Experimental data.

The results of a study to determine engineering methods for finding laminar convective heat transfer on sharp and blunt cones at angle of attack are presented. Experimental data at Mach numbers up to 17 and angles of attack up to 30 degrees are used to find a correlating parameter. The correlation is presented as a ratio of heat flux at angle of attack to heat flux at zero angle of attack as a function of a parameter based on local flow properties and body geometry. Curves are included that permit quantities used in the correlation to be easily determined. Also, theoretical methods for obtaining laminar convective heat transfer at angle of attack are reviewed and compared with experimental data. (Author)

AD-600 630 Div. 9
OTS Price $4.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
INVISCID FLOW FIELD IN THE WAKE OF HYPERSONIC BODIES.
by K. S. Wan. Aug 61, 47p R61SD099
Contract AF04 647 269

Unclassified report

Descriptors: (*Hypersonic flight, Fluid flow), (*Fluid flow, Hypersonic flight), Ballistics, Spheres, Hypersonic flow, Wake, Aerodynamic characteristics, Mathematical analysis.

The results of the calculations of the inviscid flow field behind sphere cones in hypersonic flight are presented. The flow is treated as a real gas in equilibrium in these calculations. These results show that the length of the near wake depends strongly on the main body geometry as expected. The pressure decay history along the afterbody surface is essentially independent of the afte-body shape assumed for a given main body. However, the velocity, the density, the temperature and the electron density are affected by the assumed expansion angle of the afterbody. Radially, the distributions of the flow characteristics are similar at a location sufficiently far from the base of the main body for afterbodies with the same expansion angle, but different cylindrical diameters. Furthermore, the shape of the aft portion of the bow shock is independent of the afterbody shapes assumed for a given main body under given flight conditions. (Author)

AD-600 632 Div. 9
OTS Price $9.60

Space Technology Labs., Inc., Los Angeles, Calif.
TURBULENT DIFFUSION IN THE WAKE OF A BLUNT-NOSED BODY AT HYPERSONIC SPEEDS.
Aerodynamics Dept. rept.
by Lester Lees and Leslie Hromas. Jul 61, 115p STL6110 0004MU000, STL ADR50
Contract AF04 649 1

Unclassified report

Descriptors: (*Hypersonic flight, Blunt bodies), (*Aerodynamic characteristics, Blunt bodies), Turbulence, Diffusion, Wake, Thermodynamics, Plasma physics, Equations, Ballistics.

The structure of the wake behind a blunt-nosed body at hypersonic speeds is described, and simplified representations of the outer and inner wakes are introduced. The boundary between these two regions is supposed to be a sharp front, and the growth of the inner wake depends only on the gradient and value of the enthalpy at this front. Two limiting cases of the behavior of the turbulent diffusivity are studied: (1) locally similar turbulence, in which the flow at each station behaves like a slice of a low speed self-similar turbulent wake, so that the diffusivity is proportional to the local momentum defect or drag contained in the inner wake; (2) frozen diffusivity, in which the turbulent diffusivity depends only on the initial value of the drag coefficient for the inner wake at the neck. Specific examples of the growth of the turbulent inner wake are calculated for comparison with measurements made in ballistic ranges. A typical reentry

10. FUELS AND COMBUSTION

AD-600 002 Div. 10
OTS Price $1.00

Bureau of Mines, Pittsburgh, Pa.
IGNITION CHARACTERISTICS OF FUELS AND LUBRICANTS.
Summary rept., 1 Jan-31 Dec 63
by Joseph M. Kuchta, Alphonse Bartkowiak, Ralph J. Cato, and Michael G. Zabetakis. Dec 63, 40p
Contract AF33 657 63 376; Proj. 3048; Task 304801
APL TDR64 25

Unclassified report

Report on Aviation Fuels

Descriptors: (*Jet engine fuels, Ignition), (*Airplane engine oils, Ignition), Aviation fuels, Fuels, Temperature, Alkanes.

Ignition temperatures of n-hexane, n-octane, n-decane, JP-6 jet fuel and aircraft engine oil MIL-L-7808 (0-60-18) were determined in air using heated Pyrex cylinders of 0.314-inch to 1.38-inch diameter and Nichrome wires, rods, or tubes of 0.016-inch to 0.75-inch diameter. The ignition temperature varied little with fuel-air ratio but increased as the size of the heat source was decreased. Expressions are given which define the variation of the hot surface ignition temperatures of these combustibles with the radius and the surface area of the heat source. The expressions are applicable to stagnant or low velocity flow conditions (<0.2 in/sec). In addition, the hot gas ignition temperatures of the combustible vapor-air mixtures were determined with 1/4, 3/8 and 1/2-inch diameter jets of hot air. These ignition temperatures also varied little with fuel-air ratio and increased as the diameter of the heat source was decreased. (Author)

AD-600 232 Div. 10, 16
OTS Price $5.00

Sharpley Labs., Inc., Fredericksburg, Va.
ELEMENTARY HYDROCARBON MICROBIOLOGY.
Final rept., 5 Feb 63-4 Mar 64
by J. Miles Sharpley. Apr 64, 310p
Contract AF33 657 10865, Proj. 3048, Task 304801
ASD TDR63 752

Unclassified report

Descriptors: (*Microorganisms, Petroleum), (*Bacteria, Petroleum), (*Fungi, Petroleum), (*Jet engine fuels, Petroleum), Hydrocarbons, Microbiology, Degradation, Corrosion, Handbooks, Germicides, Fungicides, Determination.

The handbook describes practical and theoretical aspects of hydrocarbon microbiology with specific emphasis on jet fuels. Areas covered include general microbiology, identification of microorganisms found in hydrocarbon systems, nutritional studies, microbial detection techniques, corrosion detection, investigation of biocides, physical protection systems, and current research efforts.

AD-600 280 Div. 10, 4
OTS Price $0.50

Rocket Power, Inc., Pasadena, Calif.
STUDY OF ROCKET ENGINE EXHAUST PRODUCTS.
Quarterly rept. no. 11, 1 Dec 63-29 Feb 64
by M. A. Greenbaum, R. E. Yates, J. A. Blaur, M. Arshadi, and H. C. Ko. 29 Feb 64, 16p RPI P QR7414 11
Contract AF04 611 7414

Unclassified report

Descriptors: (*Rocket propellants, Combustion products), (*Exhaust gases, Thermodynamics), Boron compounds, Aluminum compounds, Fluorides, Beryllium compounds, Oxides, Magnesium compounds, Chlorides, Heat of formation, Entropy, Dissociation, Solid rocket propellants, Hybrid rocket propellants.

The study of the reaction: BF3(g) + 2B(s) = 3BF(g) was completed. The second and third law values for Delta H sub F298 for BF(g), in excellent agreement, are respectively -29.0 ± 2.6 and -28.6 ± 0.5 kcal/mole. The entropy, S sub 298, obtained from this study is 47.6 ± 1.9 cal/deg/mole, which compares with the theoretical value of 47.9 cal/deg/-mole. Studies of the BeO(s)-H2O(g) reaction and AlF3(g)-Al(l) reaction are continuing and are near completion. Investigation of the MgC12(g)-Al(1) reaction has commenced and apparatus for the study of the dissociation energy of F2(g) is under construction. (Author)

AD-600 523 Div. 10, 27
OTS Price $1.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PRINCIPLES OF PROPELLANT APPLICATION IN LIQUID-PROPELLANT ROCKETS.
by N. N. Bobrov and P. I. Voropay. 26 Mar 64, 40p
FTD TT63 1063; TT 64 11709

Unclassified report

Unedited rough draft trans. of mono. Primenenie Topliva i Smazochnykh Materialov, GOSTOP, 1962, chap. 5, p. 172-199.

Descriptors: (*Rocket propellants, Reviews), (*Liquid rocket propellants, Reviews), Rocket motors (Liquid propellant), Cooling, Combustion chambers, Combustion, Monopropellants, Bipropellants, Liquid rocket oxidizers, Petroleum, USSR.

Topics include: arrangement and operation of liquid rockets; cooling; methods of feeding propellants to the combustion chamber; formation of propellant mixture and propellant combustion; heat of combustion and gasification of liquid propellants; liquid propellants; effects of fuel and oxidant properties on propellant quality; promising energy sources for rocket engines.

AD-600 603 Div. 10, 22, 30
OTS Price $1.25

Institute of Research, Lehigh Univ., Bethlehem, Pa.
THE MECHANISM OF EXPLOSION INITIATIONS IN THE STANDARD IMPACT SENSITIVITY TESTER.
Final rept., Mar 63-29 Feb 64
by Morton P. Moyle and A. J. Fedor. Mar 64, 44p
Contract AF04 611 9063, Proj. 3148, Task 314803
RPL TDR64 61

Unclassified report

Descriptors: (*Test equipment, Drop testing), (*Explosives initiators, Liquid rocket propellants), (*Liquid rocket propellants, Sensitivity), Test methods, Alkanes, Nitrates, Explosions, Hazards, Gases, Reaction kinetics.

Experimental impact sensitivity data have been obtained for normal propyl nitrate as the condensed phase with gas bodies consisting of the single component systems - Argon, Helium, Nitrogen, Freon-12; binary systems - (Helium-Oxygen), (Nitrogen-Oxygen), (Freon-12 - Oxygen); and the ternary system - (Freon-12/He - Oxygen). The experimental program has separated (for the first time) the effects of heat capacity ratio, thermal conductivity, and chemical reactivity of the gas body on the impact sensitivity. Based upon a theoretical model of initiation proposed, the impact sensitivity of n-propyl nitrate has been correlated with the thermal diffusivity of the entrapped gas body. The correlation correctly predicts that Argon, Nitrogen, and Freon-12 gas bodies require energies above 92 Kg-cm for initiation to occur. The effect of chemical reactivity of the gas body is also accounted for. (Author)

Division 9 - FLUID MECHANICS

AD-600 817 Div. 9, 26
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A METHOD OF LIQUID JET BLOWOUT UNDER HIGH PRESSURE.
by A. A. Semerchan and M. A. Plotnikov. 24 Apr 64, 12p
FTD TT64 252, TT 64 11672

Unclassified report

Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) 1963, v. 6, no. 8, p. 82-87.

Descriptors: (*Liquid jets, High pressure research), (*High pressure research, Liquid jets), Hydraulic pressure pumps, Pneumatic systems, Nozzles, Fluid flow, Design, Operation, USSR.

A hydropneumatic apparatus which has a liquid jet blowout at a velocity of 2000 m/sec and higher is described below. Experimental data on measuring the velocity of turbine oil up to 1850 m/sec is submitted. (Author)

AD-600 832 Div. 9, 15
OTS Price $0.75

RAND Corp., Santa Monica, Calif.
AN APPLICATION OF SINGULAR INTEGRAL-EQUATION THEORY TO A LINEARIZED PROBLEM IN COUETTE FLOW,
by A. Leonard and T. W. Mullikin. May 64, 27p
RM4027PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Couette flow, Two-dimensional flow), (*Integral equations, Theory), Fluid flow, Transport properties, Geometry, Mathematical models, Series, Functions, Flat plate models.

This paper treats a linearized problem in Couette flow which was derived from a simple version of the Krook statistical model for intermolecular collisions. The problem was reduced to the solving of Fredholm equations which are shown to converge rapidly for all values of the Knudsen number. The methods are based on singular integral-equations and were first developed in neutron and radiative transport theory. Cercignani, in applying Case's method to the slip flow problem, has also studied singular equations dual to those of this paper. (Author)

AD-600 839 Div. 9, 25
OTS Price $3.50

Acoustics Research Lab., Harvard Univ., Cambirdge, Mass.
THRESHOLDS OF ACOUSTIC CAVITATION.
Technical memo. no. 57
by James E. Barger. Apr 64, 204p
Contract Nonr1866 24, Proj. NR384 903

Unclassified report

Descriptors: (*Cavitation noise, Acoustic properties), Nucleation, Resonators, Acoustic transducers, Hydrophones.

Cavitation thresholds in water were measured as a function of frequency, dissolved gas, ambient pressure, and suspended particle size. The apparatus used comprises a two-liter volume of water enclosed by a spherical glass shell driven at its radially symmetric resonance frequencies by eight multiresonant piezoelectric transducers. Large acoustic pressures can be produced, ranging from 10 bars at 27 kc/s to 200 bars at 1.16 Mc/s. The threshold data can be divided into three regions. In region A, defined by f < 200 kc/s, acoustic pressure, P sub a < 3 bars, and air saturation pressure P sub s > 600 mm Hg, small air bubbles grow by rectified diffusion and stabilize at the pressure nodes. In region B, defined by f < 200 kc/s, P sub a > 3 bars, and P sub s < 500 mm Hg, transient cavities are formed that can be detected visually and aurally. In region C, f > 200 kc/s, P sub a > 3 bars, for any value of P sub s, transient cavities are formed, but their presence can be detected only acoustically. Experiments on cavitation at pressures larger than the threshold indicate that only a finite number of cavitation events can be produced in a given sample of water when it is isolated from contamination by airborne motes. In this way water can be strengthened by a factor of at least 8 by repeat cavitation. (Author)

AD-600 844 Div. 9
OTS Price $1.50

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
CHARTS OF NORMAL SHOCK WAVE PROPERTIES IN IMPERFECT NITROGEN,
by Clark H. Lewis and E. G. Burgess, III, May 64, 54p
Contract AF40 600 1000, Proj. VT8002,
AEDC TDR64 104

Unclassified report

Descriptors: (*Shock waves, Fluid dynamic properties), (*Nitrogen, Shock waves), Dissociation, Gas ionization, Molecular association, Stagnation point.

Gas-dynamic properties which include the effects of dissociation, ionization, and intermolecular forces (van der Walls) are presented for incident and reflected shock waves in equilibrium imperfect nitrogen. Charts are presented for incident shock Mach numbers in the range from 4 to 30 into (ideal) nitrogen at a temperature of 300 K and pressures in the range from 0.0010 to 10000 cm Hg. The temperature and density in any region do not exceed, respectively, 15,000 K and 150 amagats. In addition to the usual incident and reflected shock properties, stagnation conditions upstream and downstream and conditions immediately downstream of a standing shock wave are also presented. At pressures above one atmosphere in the undisturbed gas, the effects of the intermolecular forces on the gas-dynamic properties are demonstrated. (Author)

AD-600 862 Div. 9,
OTS Price $1.25

Polytechnic Inst. of Brooklyn, N. Y.
THE LAMINAR BOUNDARY LAYER WITH HYDROGEN INJECTION INCLUDING MULTI-COMPONENT DIFFUSION.
Interim technical rept.
by Paul A. Libby and Mauro Pierucci. Mar 64, 48p
Contract AF33 616 7661, Proj. 7064
ARL 64 40

Unclassified report

Descriptors: (*Laminar boundary layer, Transport properties), (*Diffusion, Laminar boundary layer), (*Hydrogen, Injection) Fluid flow, Chemical reactions, Molecular properties, Fluid mechanics, Mathematical models, Numerical analysis.

There is treated a laminar flow which is simple from the fluid mechanical and chemical points of view but which involves multi-component diffusion and relatively accurate transport properties. Thus a similar boundary layer with hydrogen injection and with chemical behavior idealized according to the flame sheet model is considered. On the basis of several numerical examples it is found that there is predicted by the present analysis boundary layer behavior significantly different from that given by analyses with simple transport; e.g., the velocity profiles with hydrogen injection resemble suction profiles because of the reduction in the rho mu product. Accordingly, the accuracy of existing analyses involving species with a spectrum of molecular weights and employing the assumption of simple transport properties would appear doubtful. (Author)

12. GUIDED MISSILES

AD-600 083 Div. 12
OTS Price $1.00

Aerospace Corp., Los Angeles, Calif.
QUARTERLY BIBLIOGRAPHY OF REPORTS PREPARED UNDER CONTRACT NO. AF 04(695)-269.
Quarterly bibliographic rept. no. 3, 1 Jan-31 Mar 64.
comp. by S. T. Keasbey. 20 Apr 64, 34p
CSR269 9990QBR3
Contract AF04 695 269

Unclassified report

Descriptors: (*Bibliographies, Spacecraft), (*Space flight, Bibliographies), (*Bibliographies, Guided missiles), Reports, Launch vehicles (Aerospace).

Reports listed in the bibliography are sectionalized in four categories. Reports grouped in each sectional category are listed in numerical order by job order number and by series. To facilitate use of these sequential listings, a Job Order Index, identifying job order numbers with major subject areas, is included in this section.

AD-600 091 Div. 12, 30
OTS Price $6.00

Air Force Missile Test Center, Patrick AFB, Fla.
JOINT AFMTC/RANGE USER DATA CONFERENCE (5th).
A Compilation of Papers Presented.
ed. by Marvin J. Woodring. 15 Apr 64, 500p
AFMTC TDR64 5

Unclassified report

Descriptors: (*Data processing systems, Guided missiles), (*Guided missile tracking systems, Data processing systems), (*Guided missile trajectories, Measurement), Inertial guidance, Instrumentation, Guided missile ranges, Atmospheric refraction, Computers, Radar pulses, Geodesics, Computers, Errors, Symposia.

The report contains all papers presented at the Fifth Joint AFMTC/Range User Data Conference. The following subjects are discussed: AMR accuracy problems, global range concept, specification of tracking needs, test designs to evaluate inertial guidance systems, orbit determination, comparisons between inertial guidance systems data and external tracking systems data, AMR geodetics, pulse radar evaluation, range instrumentation ships, Missile Impact Locating System (MILS), Missile Trajectory Measurement System (MISTRAM), optical and electronic signature data, AMR atmospheric refraction problems, and new AMR computer systems. (Author)

AD-600 100 Div. 12, 2
OTS Price $1.00

Naval Ordnance Lab., White Oak, Md.
HASP, INSTRUMENTED, STATUS REPORT AND RECOMMENDATION FOR TERMINATION OF DEVELOPMENT OF THE HEAD, 1.625-INCH ROCKET MK 2 MOD 2.
by M. J. Parker. 17 Feb 64, 37p
NOL TR64 17

Unclassified report

Descriptors: (*Sounding rockets, Flight testing), (*Rocket heads, Flight testing), (*Radiosondes, Flight testing), Projectiles, Meteorological instruments, Environmental tests, High altitude, Pressure switches, Design, Atmospheric sounding, Atmospheric temperature, Barometric pressure, Wind.

The report contains, with the exception of drawings and specifications, the supporting technical documentation which substantiated the status report and recommendation for termination of development of the instrumented High Altitude Sounding Projectile (HASP) for determining atmospheric pressure, temperature and wind velocity up to 150,000-foot altitude. The Mk 32 Mod 0 rocket motor, developed by the Bureau of Naval Weapons (RMMP), was the propulsion unit. Launching was from the LOKI tube launcher. (Author)

AD-600 417 Div. 12,
OTS Price $0.75

Martin Marietta Corp., Denver, Colo.
624A PANEL FLUTTER ANALYSIS.
May 64, 27p
Contract AF04 695 150,
SSD CR64 87

Unclassified report

Descriptors: (*Guided missiles, Panels (Structural)), (*Flutter, Analysis), Aeroelasticity, Aerodynamic loading, Flight testing, Wind tunnels, Graphics.

The panels of the Titan III liquid core were analyzed for flutter using the flutter criteria developed from Titan II flights. Because of the inherent conservatism build into this flutter criteria, a tolerance of 8% was applied to the criteria. Using this tolerance, no panels were found which did not meet the criteria. The conservatism of the flutter criteria is based on the fact that it is essentially a no-damage rather than a flutter criteria based on successful flights of Titan II. Additional conservatism can be attributed to the use of the maximum envelope of dynamic pressure, the neglecting of the stabilizing effect of the differential pressure across the skin, and to the relatively short exposure time during flight through the critical flutter regime. Wind tunnel flutter tests of similar panels have also shown that should flutter occur, it is of a mild variety, resulting in no damage to the panel. (Author)

AD-600 418 Div. 12
OTS Price $0.50

Martin Marietta Corp., Denver, Colo.
ACOUSTIC AND RANDOM VIBRATION FATIGUE REPORT
by J. Newgent. May 64, 5p
Contract AF04 695 150
SSD CR64 95

Unclassified report

Descriptors: (*Sonic fatigue, Panels (Structural)), (*Acoustics, Fatigue (Mechanics)), Guided missiles, Structural parts, Vibrations, Failure (Mechanics), Tests.

A discussion is presented showing the tests which led to the procedures for design of structural skin panels to withstand the Titan III acoustic environment. The Titan III panels are similar in size and thickness to panels used on Titan I and Titan II. These panels were subjected to higher acoustic levels on the Titan I and Titan II acoustic test program than they will experience on Titan III flights. Therefore, Titan III panels are considered structurally adequate for acoustic environment. (Author)

AD-600 426 Div. 12, 22, 31
OTS Price $0.75

Naval Weapons Lab., Dahlgren, Va.
MISSILE LAUNCHING ZONE FOR FRENCH SHIP E. E. DU CHAYLA.
by D. A. Jones, III and E. C. Heflin. 6 May 64, 29p
NWL 1916 NAVWEPS 8338

Unclassified report

Descriptors: (*Guided missile launchers, Naval vessels (Combatant)), (*Fire control systems, Naval vessels (Combatant)), (*Naval vessels (Combatant), Guided missile launchers), (*Launching sites, Naval vessels (Combatant), Site selection, Positioning devices (Machinery), Guided missile safety, Graphics, Ordnance.

AD-600 622 Div. 10, 27
OTS Price $1.00

Martin-Marietta Corp., Denver, Colo.
TITAN II TRANSLATION ROCKET MOTOR THRUST VARIATION ANALYSIS.
by C. D. Hartman. 15 May 64, 36p Martin CR64 113
Contract AF04 647 576,

Unclassified report

Descriptors: (*Rocket motors (Liquid propellant), Thrust), (*Liquid rocket propellants, Buring rate), Tests, Environmental tests, Propellants, Rocket motors.

The thrust variation of the Titan II translation motor, PD50S0003 has been determined, on the basis of 87 firing tests, to be plus or minus 250 pounds under vacuum conditions at 60 F. The variation is in accordance with SCNP-FR (SCN 57) to BMS-TII-C20,000 and change AM to PD50S0003. Analysis of the thrust variation indicates the primary cause is variation in propellant burning rate arising from allowable tolerances in propellant composition. (Author)

AD-600 768 Div. 10, 25
OTS Price $0.75

Naval Radiological Defense Lab., San Francisco, Calif.
MEASUREMENT OF THE TEMPERATURE OF THE THERMALLY IRRADIATED SURFACE OF ALPHA CELLULOSE.
N. J. Alvares. 24 Mar 64, 28p
Task DASA12.006
NRDL TR735, DASA 1467

Unclassified report

Descriptors: (*Cellulose, Surface temperatures), (*Fuels, Ignition), Thermal radiation, Determination, Optical analysis.

The transient temperature histories of exposed surfaces of specimens of alpha cellulose, irradiated by a carbon arc image furnace, are radiatively measured with a liquid nitrogen cooled, lead sulfide detector, behind a 3.4 micron, narrow band-pass interference filter. The output of the detector is displayed on an oscilloscope and is photographed by a Polaroid Land Camera. The overall time response of this system is 30 milliseconds. Reflected arc radiation off the surface of the sample at 3.4 microns is eliminated by inserting a Plexiglas filter between the arc and the specimen. A mirror is used to focus the detector onto an area of 0.21 square cm on the surface of the specimen. The detector is calibrated by substituting a standard black-body at the position normally occupied by the specimen during the measurement period. (Author)

AD-600 805 Div. 10, 27
OTS Price $0.50

Aerospace Corp., Los Angeles, Calif.
PENETRATION DISTANCE OF RETROROCKET EXHAUST PLUMES INTO AN ONCOMING STREAM
by S. E. Gilles and J. M. Kallis. May 64, 20p TDR269 4181 2
Contract AF04 695 269
SSD (19) TDR64 23

Unclassified report

Descriptors: (*Exhaust gases, Retro rockets), (*Jets, Pentration), Retro rockets, Pentration, Gas flow, Shock waves, Mathematical prediction.

A simple method for predicting the penetration distance of highly underexpanded retrorocket exhaust plumes into an oncoming free stream is developed and compared with experimental data. It is shown that the measured jet penetration distance and the standoff distance of the free stream bow shock wave are predicted closely by computing the plume flow field, using the method of characteristics for an axisymmetric plume exhausting into still air at a pressure equal to the oncoming free stream static pressure. The method is applied to a single jet and to a cluster of n identical jets. For the latter, the cluster is considered to be an equivalent single retrorocket having the same mass-flow rate (and thus an equivalent diameter (n) 1/2 times as large as the nozzle exit diameter of a single rocket). (Author)

11. GROUND TRANSPORTATION EQUIPMENT

No Entries

AD-600 626 Div. 12, 14, 15
OTS Price $13.50

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
RE-RADIATIVE STRUCTURES INVESTIGATION.
by H. Morgan. Feb 64, 197p R61SD35
Contract AF04 647 269

Unclassified report

Descriptors: (*Re-entry vehicles, Materials), (*Heat shields, Materials), (*Refractory Materials, Re-entry vehicles), Refractory metal alloys, Refractory coatings, Thermal insulation, Boost-glide vehicles, Structures, Manufacturing methods, Welding, Material forming, Strain gages, Composite materials, Graphite, Carbides, Oxides, Calcium compounds, Zirconium compounds.

There are four major subjects in the report: (1) Thermal and structural considerations, (2) Manufacturing evaluation, (3) Representative structure test program, and (4) Leading edge materials. The first describes tests of various coatings and associated heating effects for Rene' 41. It includes static and dynamic strength tests for Rene' 41, Udimet 500, and Hastelloy R235, and a study of coated joints. Welding and forming methods are discussed next for Rene' 41 and columbium alloy FS82. This data was used in the design and fabrication of a representative structural component which was tested and analyzed as discussed under item 3. The fourth subject deals with the screening of several materials which are promising for use in leading edges and nose caps. In addition, there is a small section describing strain gage operation at 1500 F, and a section dealing with material properties of many materials. (Author)

AD-600 634 Div. 12, 4, 7
OTS Price $1.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
WEAPON SYSTEM 107A-1. MARK 3 ADVANCED
RE-ENTRY VEHICLE PROGRAM. CHEMICAL ENERGY SOURCES.
Final summary rept. Subtask I-2,
comp. by C. D. Hawn. 15 Nov 61, 15p R60SD66 1 2
Contract AF04 647 269

Unclassified report

Descriptors: (*Re-entry vehicles, Power supplies), (*Fuel cells, Re-entry vehicles), Energy conversion, Batteries and components, Ion exchange, Silver compounds, Oxides, Zinc, Weapon systems, Guided missiles, Space environmental conditions, Weightlessness, Seals (Stoppers).

The feasibility and practicability of operating an ion-exchange fuel cell in a zero-gravity environment for a short period was successfully demonstrated by re-entry vehicle flight 423. In a 25-minute flight, the zero-g environment had no effect on the electrical performance of the fuel-cell design flown. The battery delivered 150 milliamperes at 6.0 volts, which was almost the predicted output. Test results indicate that, within certain limitations, the sealing of a silver oxide - zinc cell is feasible. For certain missile applications, namely where low or medium discharge rate and a limited (5 cycles maximum) cycle life is required, a sealed silver oxide - zinc battery could be developed to reliably meet the requirements. (Author)

AD-600 635 Div. 12
OTS Price $1.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
WEAPON SYSTEM 107A-1. MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM. SOLAR PHOTON ENERGY SOURCES.
Final summary rept. Subtask I-4
comp. by C. D. Hawn. 15 Nov 61, 12p R60SD66 1 4
Contract AF04 647 269

Unclassified report

Descriptors: (*Weapon systems, Systems engineering), (*Re-entry vehicles, Systems engineering), (*Solar cells, Re-entry vehicles), Solar radiation, Storage batteries, Energy conversion, Effectiveness, Power supplies, Spacecraft, Analysis.

Preliminary test results indicate that cells available in late 1959, together with batteries, will satisfy the known requirements for an earth satellite power supply in the time period 1959-1960. Modules in various series-parallel circuit combinations were tested in conjunction with different energy storage methods. Cells with a 9-percent efficiency were fabricated into systems having a capability of 9 to 10 watts per pound in an oriented system. The power-to-weight ratio is exclusive of energy storage. A matrix of cells was assembled on an aluminum honeycomb panel and a preliminary evaluation was made. Some of the cells were covered with optically coated glass slides and preliminary evaluation was made of the bonding and coating. Many of the tests were not completed because this program was reduced in scope early in 1960 as a result of funding limitations on the advanced re-entry vehicle programs. (Author)

AD-600 636 Div. 12
OTS Price $1.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
WEAPON SYSTEM 107A-1. MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM. SOLAR THERMAL ENERGY
Final summary rept. Subtask I-5
comp. by C. D. Hawn. 15 Nov 61, 16p R60SD66 1 5
Contract AF04 647 269

Unclassified report

Descriptors: (*Weapon systems, Systems engineering), (*Re-entry vehicles, Systems engineering), (*Thermionic converters, Design), Solar radiation, Energy conversion, Power supplies, Electric power production, Spacecraft, Effectiveness, Analysis.

The following results and conclusions were obtained from this study: Vacuum thermionic converters were developed that yielded 1.15 watts per square centimeter for an electrode spacing of 0.0002 inch at 1100C. Operating life of 30 hours was obtained at an output of 0.35 watt per square centimeter. Thus, the program accomplished a large part of the objective to improve thermionic converter performance. Further improvements are still needed in operating life and here the major problem is one of materials. An analytical investigation of a solar thermionic power system resulted in a preliminary conceptual design. Optical and thermal analyses were made, and these provided design optimization data for a solar power system. A preliminary solar thermionic test system was operated during the study. The maximum power level obtained was 0.56 watt at 1.4 amperes. Maximum open-circuit voltage was 0.983 volt. A control network in this experimental system was improved to provide a capability for maintaining an accuracy of 0.1 degree after the collecter had been locked on the sun. Temperatures taken in an artificial blackbody absorber operating in air during this test indicate good agreement with the analytical study. (Author)

AD-600 637 Div. 12, 19, 22
OTS Price $1.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
WEAPON SYSTEM 107A-1. MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM. STAR TRACKER.
Final summary rept. Subtask II-2
comp. by C. D. Hawn. 15 Nov 61, 15p R60SD66 2 2
Contract AF04 647 269

Unclassified report

Descriptors: (*Weapon systems, Systems engineering), (*Re-entry vehicles, Control systems), (*Star trackers, Feasibility studies), Spacecraft, Celestial guidance, Navigation.

The data resulting from this program demonstrated that: A star tracker meeting the design specifications could be built with size, weight, and power consumption capabilities that would be compatible with space vehicle requirements as of mid-1960. The critical subsystems are as follows: (a) Optical:

This report presents the factors considered in the computation and analysis required in the determination of the guided missile launching zone for the French Ship E. E. DU CHAYLA. The missile launching zone is defined and a Structural Grid Chart is given. The E. E. DU CHAYLA is a Military Assistance Program ship which employs a MARK 116 MOD 0 launcher in a MARK 13 MOD 0 launching system. (Author)

AD-600 488 Div. 12
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
AUTOMATIC HOMING AND COMBINED ROCKET GUIDANCE SYSTEMS.
by D. St. Andreescu. 8 May 64, 7p
FTD TT64 84; TT 64-11713

Unclassified report

Unedited rough draft trans. of Viata Militara (Rumania) 1963, v. 16, no. 3, p. 31.

Descriptors: (*Homing devices, Rockets), (*Guidance, Rockets), (*Rockets, Guidance), Automatic, Flight control system, USSR.

A few problems concerning the automatic guidance of rockets, and the use of the combined guidance system are presented.

AD-600 544 Div. 12, 1
OTS Price $1.75

Naval Ordnance Lab., White Oak, Md.
ANALYTIC SOLUTIONS TO THE EQUATIONS OF MOTION OF MISSILES HAVING SIX DEGREES OF FREEDOM.
Aerodynamics research rept.
by W. E. DeGrafft. 2 Jan 64, 70p
NOL TR63 241, NOL Aerody RR215

Unclassified report

Descriptors: (*Guided missile trajectories, Mathematical analysis), (*Ballistics, Guided missiles), (*Numerical methods and procedures, Ballistics), Aerodynamic characteristics, Stabilization systems, Equations, Motion.

The angular motions of several vehicles flying at a constant altitude and flight speed but accelerating in spin rate were studied. Calculations of the amplitudes and frequencies of the natural modes of motion, using the approximate solutions, are compared to results obtained from a six-degree-of-freedom computer program. It was found that the amplitudes were fairly sensitive to spin-rate accelerations and that the accuracy of the approximate expressions for the amplitudes decreases as the spin acceleration increases. The frequencies, however, were insensitive to spin acceleration and are given very accurately by the approximate solutions. An alternate solution for the modal amplitudes, assuming that the frequencies are known, is derived. Results obtained using this alternate solution are in excellent agreement with the computer program results. The approximate expression for the rolling trim angle obtained shows that for a vehicle flying at a constant speed in horizontal flight the peak rolling trim angle experienced when passing through resonance is reduced as the acceleration in spin rate increases. (Author)

AD-600 576 Div. 12, 13, 25
OTS Price $1.50

Aerospace Corp., (Los Angeles,) Calif.
ANALYSIS OF ACOUSTICAL PROBLEMS AT THE SATELLITE CONTROL FACILITY.
Final rept.
by C. S. Hoff. 20 Apr 64, 51p TDR269 4110 01 10
Contract AF04 695 259
SSD TDR63 293

Unclassified report

Descriptors: (*Military facilities, Acoustic properties), (*Satellites (Artificial), Tracking), (*Voice communication systems, Noise), Hearing, Damage, Control, California.

This is the final report of a study made of the noise environment in the satellite control facility (SCF). The results of this analysis indicate that the sound environment in the SCF is sufficiently severe to threaten the operational effectiveness of the network. The most severe sound exposures are potentially damaging to human hearing. The least severe exposures interfere with essential voice communication. The report includes sections describing on-site acoustic surveys made at the satellite test center and the Vandenberg tracking station. Critical noise problems in the SCF and acoustical criteria for operating areas are given. A concluding section presents noise reduction measures which may be utilized to reduce noisy conditions. (Author)

AD-600 601 Div. 12, 16, 28
OTS Price $1.75

Walker (Norman K.) Associates, Inc., Bethesda, Md.
THE ACCURACY OF THE AZON GUIDED BOMB AS AFFECTED BY BATTLE CONDITIONS IN WORLD WAR II
Preliminary rept.
by Alastair Anthony, Norman K. Walker, and Elizabeth DeSocio. May 64, 67p NKW-8
Contract DA36 034AMCO032R

Unclassified report

Descriptors: (*Guided bombs, Tracking), (*Stresses (Psychology), Aviation personnel), Guidance, Control systems, Operators (Personnel), Navigator-bombardiers, Guided missile personnel, Military training, Warfare, Training.

The accuracy achieved with the AZON human operator guided bomb in World War II is investigated and compared with German experience on similar missiles. Considerable degradation from the training results occurred in heavy combat and although the results are not conclusive they do suggest that the degradation for this particular system (acceleration control with 0.9 seconds lag) is serious and increases steadily with the intensity of combat. In particular cases with no opposition there was no degradation. (Author)

AD-600 621 Div. 12, 8
OTS Price $1.50

Sylvania Electric Products, Inc., Waltham, Mass.
GROUND ELECTRONICS SYSTEM FOR WS-133B MINUTEMAN. GES TEST PLAN FOR VANDENBERG AFB.
7 May 64, 51p MPO PD0007
Contract AF04 694 261

Unclassified report

Descriptors: (*Ground support equipment, Guided missiles), (*Guided missiles, Ground support equipment), (*Test equipment (Electronics), Guided missiles), Launching sites, Checkout equipment, Checkout procedures, Instruction manuals.

The ground electronic system (GES) performance when configured as a multi-flight squadron; many GES functions can only be adequately evaluated in such a configuration. The purpose of this document is to present a series of GES-oriented tests and to advocate their timely incorporation into the VAFB Test Program. Further, this document is intended to summarize the VAFB testing from the GES viewpoint, and to provide a technical baseline for coordinating and administering the preparation of detailed test requirements, procedures, instrumentation requirements and the like.

the tube containing the liquid metal. Current flowing in phase quadrature with the magnetic field through the liquid metal created a force on the liquid and caused it to flow around the tube. This action generated the momentum required to rotate the space vehicle. One of the major problems of this fluid flywheel concept was the feasibility of designing a lightweight liquid-metal pump with the pumping capacity required for the attitude control system. Two approaches were followed simultaneously under this subtask: (a) Design, construction, and test of pumps and liquid flywheel systems. (b) Digital computer study of the parameters affecting liquid flywheel designs and operation, based on overall system weights of various designs. Theoretical investigations also were made of the power supply characteristics and requirements for such a device. (Author)

AD-600 716 Div. 12, 7
OTS Price $11.00

Wyle Labs., Inc., El Segundo, Calif.
PRODUCTION ACCEPTANCE TESTING OF CABLE SPLICE CASES FOR MINUTEMAN INTERSITE COMMUNICATIONS SYSTEMS WINGS II AND III. MANUFACTURED BY CHANNELL SPLICING MACHINE COMPANY, INC.
Test rept. 29 Aug 62 - 6 Jun 63.
May 64, 150p Wyle Test14720
Contract AF04 694 287
BSD TDR63 217

Unclassified report

Descriptors: (*Protective coverings, Electric connectors), (*Electric connectors, Protective coverings), (*Intercommunication systems, Launching sites), (*Test methods, Military requirement), Electrical equipment, Performance (Engineering), Environmental tests, Experimental data, Guided missile launchers, Quality control, Electric cables.

The purpose of this production acceptance test program was to verify manufacturing techniques and to determine the suitability of the splice cases tested for use in ground burial installations for minuteman intersite communciations systems. The cable splice cases referred to herein were designed and manufactured by Channell Splicing Machine Company, Glendora, California. The test specimens were subjected to several environmental and operational conditions simulating ground burial installation. A description of the test specimens and the test program which was conducted is included in this report. (Author)

AD-600 719 Div. 12, 1
OTS Price $1.00

Aerospace Corp., [Los Angeles], Calif.
ELECTRONICS PROGRAM. SATELLITE ATTITUDE SYSTEM EXPERIMENTS.
Semi-annual technical rept., 1 Jul-31 Dec 63.
by D. J. Griep. 15 May 64, 35p TDR269 4250 32 2
Contract AF04 695 269
SSD TDR64 86

Unclassified report

Descriptors: (*Satellite attitude, control systems), (*Pneumatic systems, Spacecraft), (*Attitude control systems, Pneumatic systems), Simulators, Jets, Mercury, Flywheels, Horizon scanners, Noise, Analysis.

Progress during the period 1 January 1963 through 30 June 1963 has been achieved primarily in the determination of the pulsed performance of low thrust, cold gas, mass expulsion systems. The results obtained from these experiments required the revision of the analytical model describing the pulsed performance of cold gas pneumatic systems. A satellite attitude control system utilizing a mercury fluid flywheel is currently being mechanized on the single axis vehicle simulator. A digital logic controller was evaluated using the single axis vehicle simulator. A G. E. Mod II horizon sensor noise evaluation has been performed. The power spectral density of the sensor noise was obtained. (Author)

This subsystem would have a lens with a 12-inch focal length and 3-inch clear aperture, made of crown and low-index flint glass with an air space. Available materials permit transmission of ultraviolet light at wavelengths between 3500 and 4000 angstroms. (b) Scanning system: Mechanical scanning would be used with a photomultiplier as a detector. A vibrating reed scanner is preferred. (c) Detector system: While a vidicon technique offers advantages because of size, ruggedness and sensitivity, the initial design (mid-1960) would utilize an RCA type 1P21 photomultiplier, a proven tube with long operating lifetime, as the detector. (d) Electronics: A block diagram of a workable system was developed. (Author)

AD-600 638 Div. 12
OTS Price $1.10

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
WEAPON SYSTEM 107A 1. MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM. SUBSYSTEM DESIGN ANALYSIS.
Final summary rept. subtask II-11
comp. by C. D. Hawn. 15 Nov 61, 7p R60SD66 2 11
Contract AF04 647 269

Unclassified report

Descriptors: (*Weapon systems, Systems engineering) (*Systems engineering, Re-entry vehicles), (*Re-entry vehicles, Systems engineering), Navigation, Guidance, Atmosphere entry, Spacecraft.

Star tracker specifications were determined; these specifications were used in the star tracker study. Solar collector performance and preliminary specifications were established for earth satellite missions. Several detail engineering design studies were made on solar collector orientation that included orientation of payload to earth vertical, sensing components, and torque-producing components. A study of attitude sensing by means of body-mounted rate gyros was made and feasibility of this concept was established. Space motion simulation tests were performed on the various simulators, including a star simulator, to check out the star tracker. Funding limitations on the Advanced Reentry Vehicle Program prohibited as large an effort as originally planned in this subtask, but within the limited funding the majority of the objectives were achieved. (Author)

AD-600 640 Div. 12
OTS Price $1.00

Inter-Range Instrumentation Group, White Sands Missile Range, N. Mex.
IRIG STANDARD TIME FORMATS (FIRST REVISION).
20 Jul 60, rev. Dec 63, pub. Apr 64, 31p
IRIG 104 60

Unclassified report

Descriptors: (*Timing devices, Standardization), (*Guided missile ranges, Time signals), Data processing systems, Digital recording systems, Telemetering data, Data transmission systems.

Present and proposed missile, satellite and space research programs require the adoption of standarized time formats for the efficient inter-change of test data among the various test ranges, contractors, universities and government laboratories. These formats must be suitable for recording on magnetic tape, recording oscillographs, film and for real-time transmission, meeting the requirements of both manual and automatic data reduction. The task of standardizing instrumentation timing systems was assigned to the Tele-Communications Working Group (TCWG) of the IRIG by the Steering Committee in October, 1956. The Standard described in this paper was presented to, and accepted by, the Steering Committee at Boulder, Colorado on July 20, 1960. Definition of terms relating to description of the Standard formats will be found in the Glossary contained in this document. (Author)

AD-600 656 Div. 12
OTS Price $1.00

Aerospace Information Div., Washington, D. C.
TRACKING OF MISSILES AND SPACE VEHICLES: COMPILATION OF ABSTRACTS.
Rept. no. 21
22 May 64, 40p
AID P64 36, TT 64 11680

Unclassified report

Report on Survey of Soviet-Bloc Scientific and Technical Literature.

Descriptors: (*Tracking, Abstracts), (*Guided missiles, Tracking), (*Spacecraft, Tracking), Electromagnet properties, Ions, Ionospheric disturbances, Radio astronomy, Oscillators, USSR.

This is the twenty-first report in a series reviewing Soviet developments in tracking missiles and space vehicles. It covers materials contained in Soviet open literature published during the first half of 1963. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. Topics covered in this series are: Electromagnetic problems; ion clouds and ionosphere perturbations; and radio astronomy (radio emission, antennas, and quantum molecular oscillators).

AD-600 669 Div. 12, 9
OTS Price $5.60

Space Sciences Lab., General Electric Co., Phildelphia, Pa.
RE-ENTRY PHYSICS. VOLUME III. INTERACTION OF VEHICLES IN EARLY RE-ENTRY ENVIRONMENT. CHAPTERS 1-5.
by R. Hughes, D. Vachon, M. Kornhauser, T. Altshuler, and L. Good. Dec 60, 60p
Contract DA36 034ORD3187; Proj. 5U16 01 004

Unclassified report

Special report for the Re-Entry Physics Data Correlation, Evaluation and Documentation Program.

Descriptors: (*Re-entry vehicles, Atmosphere entry), (*Atmosphere entry, Re-entry vehicles), Space charges, Drag, Aerodynamic heating, Heat transfer, Stellar eclipses, Thermal radiation, Plasma physics, Magnetic fields, Space environmental conditions, Data.

This volume is the third of a series on re-entry physics. In this volume, aspects of the interaction of vehicles in early re-entry environment are covered, including space charge and electrostatic drag, sputtering, meteoroid erosion, thermal irradiance and body temperature, and star occultation. (Author)

AD-600 683 Div. 12
OTS Price $1.10

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
WEAPON SYSTEM 107A-1. MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM. INERTIA WHEEL CONTROL.
Final summary rept. Subtask II-6
comp. by C. D. Hawn. 15 Nov 61, 10p R60SD66 2 6
Contract AF04 647 269

Unclassified report

Descriptors: (*Weapon systems, Systems engineering), (*Re-entry vehicles, Systems engineering), (*Inertial guidance, Spacecraft), Attitude control systems, Liquids, Flywheels, Feasibility studies.

An investigation was conducted to determine the feasibility of designing liquid flywheel attitude-control systems. The flywheel as constructed was composed of the following: a tube formed into a ring, an electromagnetic pump, and a liquid metal serving as the armature conductor and flywheel. A permanent magnet was positioned to develop a constant flux field across

knowledge pertaining to waves and current action, salinity and temperature variations, bottom topography, marine organisms, chemical and physical properties of sea water, etc. In order to treat all of this data, it was convenient to first locate and distinguish the oceans and then describe the ocean bottom and ocean contents before finally describing the dynamic factors acting on the oceans. (Author)

AD-600 356 Div. 13, 14, 30
OTS Price $0.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
STATIC AND DYNAMIC SHEAR STRENGTH OF DRY SAND.
Technical Note
by R. L. Lytton and C. R. White. Apr 64, 22p
Proj. Y F008 08 03 402 and DASA 13 018
NCEL N585

Unclassified report

Descriptors: (*Sand, Mechanical properties), (*Loading (Mechanics), Sand), Soil Mechanics, Mechanical properties, Internal friction, Shear stresses, Tests, Statics, Dynamics.

The tests reported here were made to determine the strength properties of a specific sand used in large quantities for dynamic soil-structure interaction experiments and dynamic bearing capacity experiments at NCEL. Another purpose was to disclose the effect of loading rate on the shear strength of dry sand. Results were found to be similar to those obtained by other researchers, i.e. loading rate has little effect upon the shear strength of dry sand. Cohesion of the sand was zero. Static angle of friction was 44.0 degrees and dynamic angle of friction was 43.1 degrees. Auxiliary tests revealed the effects on dynamic angle of friction of small amounts of absorbed moisture, grain size segregation, and grain shape. (Author)

AD-600 357 Div. 13, 14
OTS Price $0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
FIELD EVALUATION OF EXTERIOR CONCRETE AND MASONRY PAINTS.
Technical note
by A. P. deMarco and C. V. Brouillette. 28 Feb 64, 19p
Proj. Y F015 06 902
NCEL N480

Unclassified report

Descriptors: (*Plastic paints, Environmental tests), (*Concrete, Salt spray tests), Buildings, Protective treatments, Solar radiation, Weatherproofing, Wear resistance, Rainfall, Absorption.

A large-scale field application to evaluate four currently specified exterior concrete and masonry paints has been undertaken. The paints were applied on the ocean side of a large concrete building in such a way that each paint received the same set of slightly varying exposure conditions. Since the ocean side of the test location faces directly south, the paints under evaluation are subjected to natural weathering under the influence of solar radiation and salt spray. Present findings indicate that one of the four paints, a cement-water paint, has an undesirable water absorbing characteristic under exposure to continuous rainfall. (Author)

AD-600 511 Div. 13, 14
OTS Price $0.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
LAYERED PAVEMENT INVESTIGATIONS, TEST PROCEDURE.
by J. Nielsen. Mar 63, 23p
Task Y F015 15 02 119
NCEL N579

Unclassified report

Descriptors: (*Test equipment, Test methods), (*Pavements, Design), Materials, Simulation, Operation, Labor, Industrial equipment, Road-building equipment, Landing fields, Quality control, Tests.

The NCEL mechanical subgrade is a device which simulates the action of a natural subgrade. This apparatus is intended for use in evaluating materials for airfield pavement construction. The adoption of a test procedure is a preliminary step in the evaluation of all types of airfield pavement materials using the mechanical subgrade and the concepts of the layered pavement design method. (Author)

AD-600 619 Div. 13
OTS Price $1.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
MODIFIED T-5 BARRACKS CONTROLLED CLIMATIC HEATING STUDIES.
Technical rept.
by C. R. Hoffman. 12 May 64, 56p
Task Y F015 11 01 149
NCEL R286

Unclassified report

Descriptors: (*Protective shelters, Polar regions), (*Heating plants, Protective shelters), (*Polar regions, Heating plants), *Air conditioning equipment, Military personnel, Cooling and ventilationing equipment, Military installations.

In an effort to improve personnel comfort, heat-loss studies of the Modified T-5 Barracks, developed for polar use, were conducted and two experimental heating systems were designed, fabricated, and tested. One, is a hot-air floor plenum heating system providing both radiant and convection heating. The other is a complete air-conditioning system incorporating heating, humidification, and fresh-air ventilation. This system was designed for a packaged temporary polar camp developed. This report presents the results of the heat-loss study and the evaluation of the two heating systems. (Author)

AD-600 700 Div. 13
OTS Price $0.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
SNOW MOVEMENT LITERATURE REVIEW.
by Nancy S. Stehle. 28 May 64, 21p
Task Y FO15 11 01 025
NCEL N594

Unclassified report

Descriptors: (*Polar regions, Snow), (*Snow, Drift), Reviews.

Polar areas are plagued with drifting snow, with resulting problems in logistics and maintenance. A literature search on present knowledge of drift and drift control shows that laboratory tests on the physics of snow movement should be conducted using snow and material simulating snow for scale model studies. These tests then would further knowledge of drifting snow more quickly than can be obtained by field observation alone. However, the laboratory studies must be coupled with field tests in order to establish their validity. (Author)

AD-600 866 Div. 13
OTS Price $0.50

Boeing Co., Seattle, Wash.
SPECIAL TEST EVALUATION REPORTS - STP III: AMERICAN AIR FILTER ECP 90 INVESTIGATION ST-101.
Test rept.
by J. Vincent. [1964], 11p T2-3209 13
Contract AF04 694 422

Unclassified report

Descriptors: (*Compressors, Performance (Engineering)), (*Gas filters, Air), Failure (Mechanics), Noise, Tests, (Control systems, Reports, Valves.

13. INSTALLATIONS AND CONSTRUCTION

AD-600 031 Div. 13, 8
OTS Price $0.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
EMI-SHIELDING EFFECTIVENESS OF COPPER-SPRAYED ENCLOSURES.
Technical rept.
by Homer A. Lasitter. 1 May 64, 26p
Proj. Y F006 09 02 212
NCEL R290

Unclassified report

Descriptors: (*Electromagnetic shielding, Radiofrequency interference), (*Copper coatings, Effectiveness), Measurement, Economics, Plywood, Structures.

The shielding effectiveness of three screen rooms was determined and evaluated before and after copper-spraying. Cost and manpower requirements for copper-spraying are discussed.

AD-600 261 Div. 13, 16
OTS Price $1.00

Factory Mutual Research Corp., Norwood, Mass.
FIRE HAZARD TO FALLOUT SHELTER OCCUPANTS. A CLASSIFICATION GUIDE.
Final research rept.
by J. B. Smith, E. W. Cousins, and R. M. Newman.
3 Apr 64, 40p FMRC15328
Contract OC PS64 40, Task 1133A

Unclassified report

Descriptors: (*Fires, Shelters) (*Shelters, Fires) Hazards, Buildings, Standards, Classification, Urban areas, Civil defense systems.

This classification guide was prepared for the use of architects and engineers. The guide was field-tested by several architects and a consulting engineer. Trial surveys were made at existing designated shelters in buildings of varied construction, occupancy, and age, in relatively congested areas. The guide was found to be simple and easy to use. Consistent results were obtained.

AD-600 305 Div. 13, 2, 31
OTS Price $3.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
STRUCTURES IN DEEP OCEAN: ENGINEERING MANUAL FOR UNDERWATER CONSTRUCTION. CHAPTER 3. RECONNAISSANCE AND POSITIONING.
Technical rept.
by T. T. Lee, 15 Mar 64, 236p
Task Y F015 01 001a
NCEL R284 3

Unclassified report

Descriptors: (*Site selection, Underwater), (*Underwater, Construction), (*Instruction manuals, Engineering), Position finding, Navigation, Civil engineering, Oceans, Military strategy, Ocean bottom sampling, Oceanographic vessels.

The chief factors involved in reconnaissance and positioning for a deep-ocean construction site are described in this report. In determining surface position from landfall, the two chief methods are the optical (sextant-angle fix) and the electromagnetic methods. Electromagnetic methods involve radar and other techniques such as the Tellurometer, Raydist, and Geodimeter. In determining position from a point out of sight of land, celestial navigation is the general measurement. Electromagnetic techniques, such as Shoran and Loran, are effective for long-range accuracy (distances between 50 and 1400 miles). LORAC is considered to be one of the mot accurate long-range (500 miles or greater) positioning systems. Maintaining a position relative to an underwater construction site represents a major problem to the constructor. Factors involved include that o a suitable mooring system. Conventional anchor cable systems are commonly used for depths less than 6,000 feet. For greater depths, the U. S. Navy Bureau of Yards and Docks has devised a special deep-sea mooring system.

AD-600 306 Div. 13, 2, 31
OTS Price $0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
STRUCTURES IN DEEP OCEAN: ENGINEERING MANUAL FOR UNDERWATER CONSTRUCTION. CHAPTER 1. INTRODUCTION.
Technical rept.
by W. J. Tudor. 15 Mar 64, 9p
Task Y F015 01 001a
NCEL R284 1

Unclassified report

Descriptors: (*Civil engineering, Underwater), (*Underwater, Construction), (*Instruction manuals, Engineering), Oceanographic data, Oceanographic equipment, Marine engineering, Oceans, Military strategy.

The objective of this manual is to provide information on environments, systems, and techniques relative to construction in deep ocean areas. Developments in Naval warfare have placed emphasis on the dep ocean areas as an operating environment; consequently, in support of these operations, there is a need for knowledge concerning methods of construction in the deep ocean. It is realized that these methods can differ markedly from those used in construction on land; therefore, in this relatively new field many deficiencies exist which can be reduced only by research and development. This will require considerable time; however, in the interim, construction must continue. Toward making this as effective as feasible, existing information has been reviewed and digested, and is presented in this manual. Information has been provided by scientists, engineers, and offshore operators; especially those engaged in petroleum production. Deep ocean construction is a logical extension of the responsibility of the Bureau of Yards and Docks for construction of Naval facilities. This manual should assist in meeting this responsibility by providing engineers, constructors, planners, and others engaged in deep ocean construction with pertinent information. (Author)

AD-600 307 Div. 13, 2, 31
OTS Price $2.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
STRUCTURES IN DEEP OCEAN: ENGINEERING MANUAL FOR UNDERWATER CONSTRUCTION. CHAPTER 2. DEEP-OCEAN ENVIRONMENT.
Technical rept.
by W. J. Tudor, 15 Mar 64, 136p
Task Y F015 01 001a
NCEL R284 2

Unclassified report

Descriptors: (*Oceanology, Data), (*Underwater, Construction) (*Instruction manuals, Engineering), Civil engineering, Marine geology, Oceans, Military strategy.

Technological development indicates that much of the naval warfare of the future will occur at deep ocean depths. Concurrently, there is a need for additional knowledge of methods for construction in deep oceans; therefore, the objective of this report is to provide information on environments and to describe systems and techniques developed for construction in deep ocean areas. This chapter contains environmental

14. MATERIALS (NON-METALLIC)

AD-600 030 Div. 14, 10, 17
OTS Price $0.50

Coating and Chemical Lab., Aberdeen Proving Ground, Md.
THE FIELD EVALUATION OF AN EXPERIMENTAL AIR DRY FUEL RESISTANT COATING.
Interim rept. no. 1
by Virgil O. Hatch. 6 Mar 64, 16p
Proj. 1H024401A110-05
CCL 160

Unclassified report

Descriptors: (*Plastic coatings, Environmental tests), (*Acrylonitrile polymers, Plastic coatings), (*Butadienes, Polymers), (*Fuel tanks, Corrosion inhibition), Coatings, Phenolic plastics, Elastomers, Fuel trucks.

The object of the investigation is to field evaluate an experimental air dry fuel resistant coating based on phenolic modified butadiene-acrylontrile copolymer. The coating was applied to the interior of eight, 1200 gallon, 6 x 6, 2 1/2 ton, fuel transporters and examined every three months for periods up to 21 months. There was no evidence of cracking, peeling or sluffing of the coating when exposed to various fuels. Small corrosion spots, due to improper cleaning prior to coating, were easily cleaned and brush coated. These retouched areas have given excellent service to date. The coating was also applied to the interior of a series of 30 gallon and 5 gallon containers by spray and slush respectively. The containers were filled with various fuel-water mixtures and placed on exterior exposure. Visual inspection after 12 months showed the coating to be in excellent condition. (Author)

AD-600 033 Div. 14, 17
OTS Price $0.75

Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
EFFECT OF SURFACE PREPARATION AND ELEVATED TEMPERATURE STORAGE ON ADHESIVE BONDS TO ALUMINUM.
by Raymond F. Wegman. May 64, 26p
Proj. 1H 02 4401A110
PA TM1255

Unclassified report

Descriptors: (*Aluminum, Bonding), (*Adhesives, Strength), (*Epoxy plastics, Adhesives), Surfaces, Preparation, Bonds, Tensile properties, Phenolic plastics, Storage, Aging (Materials), Polyamide plastics.

Two room-temperature-curing epoxy-type adhesives were used to bond aluminum to aluminum. Two chemical methods of treating aluminum were used. The effects of variations in test temperature, MIL-STD-304 conditioning, and elevated and room temperature storage for 1 year were evaluated. In all of the cases investigated, elevated temperature storage had no detrimental effect after one year. However, there was in all cases a decrease in tensile strength during the initial stages of heat storage and no substantial increase was noticed until after 6 months. The choice of surface treatment, which is dependent upon the adhesive selected, can result in a difference in bond strengths. In the case of the novolac-based epoxy, there was a substantial difference between the tensile strengths obtained using the two treatment methods. The liquid hydrochloric acid treatment was superior to the commercial paste treatment. In the case of the polyamide-epoxy, the results obtained were substantially the same regardless of the method selected. (Author)

AD-600 067 Div. 14, 4
OTS Price $1.00

Union Carbide Plastics Co., Bound Brook, N. J.
RESEARCH ON IMPROVED EPOXY RESINS.
Quarterly progress rept. no. 4
by W. P. Mulvaney, R. F. Sellers, and S. G. Smith. 1 May 64, 31p
Contract Nonr4172 00

Unclassified report

Descriptors: (*Epoxy plastics, Physical properties), (*Epoxides, Molecular structure), Cyclopentanes, Ethers, Molecular isomerism, Cyclopentenes, Phenols, Polycyclic compounds, Casting, Tensile properties, Compressive properties, Thermal properties, Filiment wound construction, Binders.

The purpose of the program is to define the correlation of novel polyepoxide molecular configurations with the physical properties of cast resins as the initial step in providing significant improvements in filament reinforced plastics for deep submergence structures. A discussion of the relationship of physical properties to molecular configuration and to the relative purity of representative sample resins is presented as interpreted from cast resin data. Progress is described on the continued evaluation of various novel epoxy molecular structures and modificatons thereto. (Author)

AD-600 121 Div. 14, 4
OTS Price $1.00

Naugatuck Chemical Div., United States Rubber Co., Conn.
SYNTHESIS OF REGULATED STRUCTURE POLY-PHENYLETHER-SILOXANE BLOCK COPOLYMERS.
Terminal rept., 1 Jul 61-15 Jan 64
by Robert MacFarlane, Jr. and Eugene S. Yankura. Mar 64, 34p
Contract DA19 020ORD5507

Unclassified report

Descriptors: (*Heat resistant plastics, Silanes), (*Elastomers, Silanes), (*Silicone plastics, Synthesis (Chemistry)), Diphenyl, Ethers, Alcohols, Copolymerization, Condensation reactions, Hydrolysis, Dehydration.

In an attempt to prepare elastomers stable at high temperatures, polymers with molecular weights estimated to be as high as 100,000 were formed by condensation of p,p'-dihydroxydiphenylether with diphenylsilanes. Thermal gravimetric analyses for some of these polymers are reported, and their thermal stability and elastomeric properties are discussed. The preparation of dihydroxy derivatives of di- and poly- phenyl ethers by alkaline hydrolysis and by intermolecular dehydration is also described. (Author)

AD-600 175 Div. 14, 1, 26
OTS Price $1.00

Snell (Foster D.) Inc., New York.
RAIN REPELLENT.
Interim rept. no. 1, 15 Jan - 15 Apr 64
by W. Miglas, E. McDonnell and J. Mitchell Fain. 22 Apr 64, 33p
Contract NOw64 0231c, continuation of Contract NOw62 0557c

Unclassified report

Descriptors: (*Moistureproofing, Films), (*Antirain agents, Manufacturing methods), Silicone plastics, Titanium, Copolymerization, Surface-active substances, Zirconium, Chemical reactions, Silanes, Windshields, Aircraft.

A reaction mechanism is provided for formation and utilization of silicone-titanium copolymer H. The use of heated air on the rain spray apparatus did not result in increased durability of formulations containing silicone-titanium copolymer H. A new rain spray apparatus is under construction which is designed to deliver a more uniform rain spray and allow the use of larger test panels. In the preparation of silicone-zirconium

The data obtained indicates that both Instrumentation Control Air Compressors were operating normally at all times. The noisy chatter of the check valve observed on the LF compressor suggests that the air compressors which were removed from service at MAFB for excessive noise may not have had an impending failure. The investigation of the two STP III air compressors before and after the installation of AAF ECP 90 did not reveal any deterioration in performance or any impending failures. (Author)

AD-600 869 Div. 13, 14, 30
OTS Price $1.25

Forest Products Lab., Madison, Wis.
PERFORMANCE OF SANDWICH PANELS IN FPL EXPERIMENTAL UNIT.
Research paper
by L. O. Anderson and Lyman W. Wood. May 64, 41p
FPL 12

Unclassified report

Descriptors: (*Sandwich panels, Environmental tests), (*Test facilities, Sandwich construction), Buildings, Structural properties, Mechanical properties, Plywood, Construction, Honeycomb cores, Manufacturing methods, Materials.

Design and construction details of the Experimental Unit at the U. S. Forest Products Laboratory at Madison, Wis., in 1947, to provide a facility for longtime exposure tests of various types of sandwich wall panels under conditions simulating those of dwellings. The performance of individual panels after periods of exposure up to 15 years is discussed. (Author)

Descriptors: (*Refractory materials, Thermal radiation), (*Transparent panels, Heat transfer), Aluminum compounds, Oxides, Absorption, Thermal conductivity, Solids, Emissivity, Single crystals, High temperature research, Microstructure, Diffusion, Wave transmission, Crystal lattices, Scattering, Perturbation theory, Numerical analysis, Equations, Integration.

Thermal radiation from refractory oxide materials is a volume, rather than a surface, phenomenon. General equations describing emissivity, transmissivity, and reflectivity for scattering and absorbing systems have been derived in a form that allows determination of the necessary material constants and calculation of emissivity under isothermal and non-isothermal conditions. Methods of evaluating conditions under which these equations are applicable have been derived, and a simple expression developed for radiant energy transfer when conduction in the solid is negligible relative to the radiant energy transfer in the solid. Experimental apparatus has been developed and measurements of the isothermal emissivity of several refractory oxides and the transmissivity of single crystals have been made over the wavelength range 1-15 microns at temperatures up to 1350 C. Emissivity was found to depend strongly on composition, microstructure and wavelength. Different grades of alumina ceramics range from about 0.2 to above 0.9 in the near infrared. Diffuse transmissivity measurements provided experimental values from which scattering was calculated for each sample. Large scattering values were obtained, however, emissivities calculated from these measurements agreed well with experimentally measured data. Results show that the normal emissivity in these systems is substantially larger than the hemispherical emissivity in contrast to opaque solids where they are nearly the same. (Author)

AD-600 397 Div. 14
OTS Price $0.50

Clapp (William F.) Labs., Inc., Duxbury, Mass.
THAMES CELPLY PANELS.
Final rept.
4 Mar 64, 5p WFCL12813
Contract NObs90044

Unclassified report

Descriptors: (*Plywood, Protective treatments), (*Antifouling coatings, Liquid immersion tests), Protective treatments, Impregnation, Marine borers, Liquid immersion tests, Sea water, Life expectancy, Preservation.

The results of sea water immersion tests indicate that: The Celcure-treated mahogany plywood known as Thames-Celply was sufficiently resistant to marine borer attack to merit further consideration for marine use, but the length of this test, 36 months, was not enough to conclusively predict an extended life for this product. Formula 105 AF paint, both alone and applied over Formula 117 pretreatment, is compatible with this product and shows a good service life of at least 36 months. Formula 121 AF paint is compatible with this product and shows a good service life of at least 36 months. (Author)

AD-600 398 Div. 14
OTS Price $0.50

Clapp (William F.) Labs., Inc., Duxbury, Mass.
IMPREGNATED SOUTHERN YELLOW PINE SAPWOOD PANELS.
Final rept.
24 Feb 64, 8p WFCL12808
Contract Nobs90044

Unclassified report

Descriptors: (*Wood, Protective treatments), (*Protective treatments, Liquid immersion tests), Impregnation, Liquid immersion tests, Sea waters, Preservation, Marine borers, Life expectancy, Creosote.

The results of sea water immersion tests would tend to indicate that: Southern Yellow Pine sapwood panels treated to 1.5-2lbs. per cubic foot retention of Celcure showed five years of resistance to attack by marine borers and the treatment therefore could be considered serviceable for five years. Southern Yellow Pine sapwood panels treated to 1-1.5 lbs. per cubic foot retention of Erdalith showed three years of resistance to attack by marine borers and could be considered for limited service in temporary construction. This was the least successful of the treatments tested. Southern Yellow Pine sapwood panels treated to 30-35 lbs. per cubic foot retention of a 60/40 creosote-coal tar mixture showed more than six years resistance to attack by marine borers and was the most successful of the treatments tested. Southern Yellow Pine sapwood panels treate to 25-30 lbs. per cubic foot retention of creosote showed at least six years of resistance to attack by marine borers and therefore the treatment could be considered serviceable for at least six years. (Author)

AD-600 399 Div. 14
OTS Price $0.50

Clapp (William F.) Labs., Inc., Duxbury, Mass.
PARINARIUM sp. - LIBERIAN PINE-AFRICAN OAK-african wishmore.
Final rept.
24 Feb 64, 8p WFCL 12807
Contract NObs90044

Unclassified report

Report on African Woods.

Descriptors: (*Wood, Antifouling coatings), (*Antifouling coatings, Liquid immersion tests), Liquid immersion tests, Sea water, Preservation, Marine borers.

After sea water immersion tests all panels coated with formula 121 anti-fouling paint remained intact and the paint coat remained serviceable and retained its anti-fouling properties for the entire 33 month period. The liberian Pine. African Oak and Wishmore panels coated with Formula 105 anti-fouling paint remained intact. The paint coat itself remained serviceable and retained its anti-fouling properties for the entire 33 month period. Two of the three Parinarium panels coated with Formula 105 anti-fouling paint were attacked by few to several abortive Bankia and a few small Pholads. On the Parinarium panels the Formula 105 paint retained its anti-fouling properties to the end of the test period but failed as a coating at 24 months.

AD-600 414 Div. 14
OTS Price $0.50

Clapp (William F.) Labs, Inc., Duxbury, Mass.
FOREST PRODUCTS PLYWOOD PANELS, 1958 SERIES.
Final rept.
18 Feb 64, 7p WFCL 12801
Contract NObs90044

Unclassified report

Descriptors: (*Plywood, Liquid immersion tests) Liquid immersion tests, Sea water, Marine borers, Impregnation, Preservation.

The results of sea water immersion tests would indicate that: The products indentified as 15 EM, 20 EM, 15 EF and 20 EF showed no signifient resistance to marine borer attack. The Products identified as 5 EM and 5 EF were riddled by Bankia, but in the inner plis only; the outer plies were still in serviceable condition after 60 months exposure. Provided that no cut edges were exposed to marine borer attack this product could show at least 5 years of service life. However, if the products were subjected to any shock or abrasion penetrating the outer ply, the service life would be sharply curtailed. The products identified as 10 EM and 10 EF showed only a trace attack by Pholads and could be considered serviceable for at least 5 years in marine use. None of the products tested showed any resistance to marine fouling. (Author)

copolymers reaction at a temperature of 138-140 C. results in a clear liquid yielding a dry, waxy film, whereas reaction at 105 C. results in a cloudy liquid giving a soft and tacky film. (Author)

A-600 247 Div. 14, 4
OTS Price $1.25

Atlantic Research Corp., Alexandria, Va.
DEVELOPMENT OF LOW-DENSITY HIGH-STRENGTH FOAMED PLASTICS VIA IONIC POLYMERIZATION.
Technical rept.
Mar 64, 41p
Contract DA19 129AMC9X; Proj. 1K643 303D547
ANL C and OM2

Unclassified report

Descriptors: (*Expanded plastics, Preparation), (*Vinyl plastics, Expanded plastics), Ethers, Polymerization, Methanols, Copolymerization, Foams, Physical properties, Density, Tensile properties, Catalysis, Ions, Free radicals, O-Heterocyclic compounds.

Equimolecular mixtures of mono- or di-allyl ethers of trimethylolpropane and sulfur monochloride gave tough, spongy foams when reacted in a halogenated solvent, which also acted as a blowing agent. Reaction was rapid at room temperature, but quite slow at 0 F. A number of vinyl alkyl and divinyl ethers were evaluated using cationic catalysts and chlorinated solvents as blowing agents at room temperature. Foams were obtained in a number of cases, and the flexibility of the foams was related to the ratio of the mono-vinyl to the divinyl ether. The foams were quite spongy and friable. Use 3,4-dihydro-2H-pyran-2-methanol as a co-monomer with vinyl ethers gave moderately strong, lightweight foams. (Author)

AD-600 249 Div. 14, 4
OTS Price $2.50

Mellon Inst. of Industrial Research, Pittsburgh, Pa.
TECHNICAL REPORT NO. 11.
Rept. for 1 Sep 63-29 Feb 64
29 Feb 64, 110p
Contract Nonr2693 00; Task NR356 407

Unclassified report

Descriptors: (*Siloxanes, Crystallization), (*Styrene plastics, Synthesis (Chemistry)), (*Inorganic polymers, Complex compounds), (*Polyester plastics, Radiation damage), Silicone plastics, Crystal structure, Styrenes, Polymers, Molecular structure, Potassium compounds, Metalorganic compounds, Zinc compounds, Organic phosphorus compounds.

Contents:
Crystallization kinetics and morphology of poly-(tetramethyl-parasiliphenylene) siloxanes (TMPS), by J. H. Magill.
Multifunctional comb branched polystyrene, by T. Altares, Jr.
The preparation and characterization of some star- and comb-type branched polystyrenes, by D. P. Wyman, T. Altares, Jr., V. R. Allen, and K. Meyersen.
Synthesis of virtually monodisperse linear and tetrachain polymers with idealized structures by use of a novel initiator, alpha-phenylethylpotassium, by S. -P. S. Yen.
The forced oscillation torsion pendulum, by M. H. Birnboim.
Investigations on novel inorganic polymers, by G. C. Berry.
Measurements on irradiated Mylar, by R. E. Kerwin.

AD-600 339 Div. 14
OTS Price $1.00

Picker X-Ray Corp., Cleveland, Ohio.
RESEARCH AND DEVELOPMENT ON ADVANCED GRAPHITE MATERIALS. VOLUME XVII. RADIOGRAPHY OF CARBON AND GRAPHITE.
Technical documentary rept., 1 Feb 62-31 Jan 63,
by Thomas C. Furnas, Jr., and M. R. Rosumny. Apr 64, 32p.
Contract AF33 616 6915, Projs. 7350, 7381, Tasks 735002, 738102
WADD TR61 72, vol. 17

Unclassified report

Descriptors: (*Graphite, Radiography), (*Refractory materials, Radiography), Carbon, Thickness, Density, Quality control, Sensitivity, Films, Collimators.

A study was made to establish optimum exposure conditions for the radiographic detection of minimum size defects in thicknesses of graphite varying from four to sixteen inches. Through the use of grids and associated techniques, 0.5 per cent sensitivity or better was attained on high density graphite as follows: 4 in. Graphite -- 0.5 per cent sensitivity on M, single emulsion on M and HD films at 110 KV; 8 in. Graphite — 0.4 per cent sensitivity on AA film at 150 KV; 12 in. Graphite -- 0.35 per cent sensitivity on HF film with Cobalt-60; 16 in. Graphite -- 0.3 per cent sensitivity on HD film with Cobalt-60. Other parameters and techniques were investigated, such as direct X-ray magnification, screens, films, developers, and position of defect. The use of the grid made the greatest contribution towards an increase in sensitivity. (Author)

AD-600 340 Div. 14
OTS Price $2.25

National Carbon Company, Cleveland, Ohio
RESEARCH AND DEVELOPMENT ON ADVANCED GRAPHITE MATERIALS, VOLUME XXX - OXIDATION RESISTANT GRAPHITE BASE COMPOSITES.
Technical documentary rept., Sep 61 - Dec 62
by K. J. Zeitsch and J. M. Criscione. Apr 64, 81p
Contract AF 33 616 6915, Projs. 7350 and 7381,
Tasks 735002 and 738102
WADD TR61 72 V30

Unclassified report

Descriptors: (*Graphite, Composite materials), (*Refractory materials, Graphite), (*Coatings, oxidation inhibition), Additives, Zirconium compounds, Borides, Silicon, Boron, Thorium, Niobium, Hot working, Oxidation.

The report describes certain graphite base composites capable of resisting oxidation by forming a protective coating from their oxidation products. When first exposed to oxidizing conditions, the additives or graphite-additive reactants oxidize and form a coating which protects the composite against further oxidation. Since these materials are homogeneous composites, they can be machined without destroying their oxidation resistant characteristics. The most effective additives investigated were combinations of ZrB2, Si, B, Cb, and Th. All materials were prepared in a one-step operation by hot pressing. The report describes the equipment required to fabricate graphite-refractory composites by hot pressing at temperatures up to 3100 C. Oxidation test methods employ indirect induction heating, resistance heating, arc image techniques, and electromagnetic levitation. (Author)

AD-600 370 Div. 14, 25
OTS Price $2.75

Lexington Labs., Inc., Cambridge, Mass.
THERMAL RADIATION CHARACTERISTICS OF TRANSPARENT, SEMI-TRANSPARENT AND TRANSLUCENT MATERIALS UNDER NON-ISOTHERMAL CONDITIONS.
Technical documentary rept., May 61-Jun 62
by Robert C. Folweiler. Apr 64, 125p
Contract AF33 616 8368, Proj. 7360, Tasks 736001, 736004
ASD TDR62 719

Unclassified report

Fiberglass-reinforced plastic was first used as a laminated wood reinforcement for a primary structural rotor blade application in a helicopter development program in 1953. Since that time, the use of fiberglass cloth and oriented glass fibers for primary structures has increased at a rapid rate and has culminated in the development of an all-fiberglass rotor blade of superior performance. This report is a compilation and analysis of significant test data obtained in the evaluation of the all-glass rotor blade. Included are the associated areas of the development of glass fiber control tubing, the use of glass reinforcement for the Roto-prop (rotor-propeller) on a V/STOL aircraft, the elastic hinge study suggesting a maintenance-free tail rotor, and the effects of weathering upon glass blade properties and structure. (Author)

AD-600 529 Div. 14
OTS Price $1.75

Prevention of Deterioration Center, NAS-NRC, Washington, D. C.
CONTROL OF MICROBIAL GROWTH ON LEATHER AND TEXTILES.
by Richard W. H. Lee. 1 Jul 63, 65p
PDC 863 028; PDL48237

Unclassified report

A Survey of Recent Literature.

Descriptors: (*Fungus proofing, Bibliographies), (*Bibliographies, Fungus proofing), (*Fungusproofing, Textiles), (*Fungusproofing, Leather), Finishes and finishing, Protective treatments, Cellulose, Fibers(Synthetic), Quinones.

AD-600 552 Div. 14, 4
OTS Price $5.00

Cincinnati Univ., Ohio.
THE INFRARED SPECTRA OF POLYMERS, RESINS, AND RELATED MATERIALS IN THE 700-250 cm-1 REGION AND THEIR ANALYTICAL APPLICATION.
Technical documentary rept., Mar 62-May 63
by Dieter O. Hummel. Apr. 64, 354p
Contract AF33 616 7450, Proj. 7360, Task 736005
ASD TDR64 712

Unclassified report

Descriptors: (*Polymers, Spectra (Infrared)), (*Plastics, Spectra (Infrared)), (*Waxes, Spectra (Infrared)), (*Plasticizers, Spectra (Infrared)), (*Organic Solvents, Spectra (Infrared)), Polyethylene plastics, Styrene plastics, Halocarbon plastics, Polyester plastics, Acrylic resins, Cellulosic plastics, Vinyl plastics, Phenolic plastics, Polyamide plastics, Amino plastics, Silicone plastics, Molecular structure.

The infrared absorption spectra of 191 polymers, resins, waxes, plasticizers, monomers, and solvents were investigated from 700 cm-1 to 250 cm-1. The absorption bands of the more important chemical families were incorporated into correlation charts. The structure of the substances investigated are discussed with respect to their infrared spectra (Author)

AD-600 560 Div. 14, 26
OTS Price $1.25

Institute of Tech., Univ. of Minnesota, Minneapolis.
DETERIORATION OF MATERIALS IN STORAGE AND RECOMMENDED STORAGE CONDITIONS.
Progress rept. no. 6
1 Jan 56, 42p
Contract NOy79585,

Unclassified report

Descriptors: (*Controlled atmospheres, Storage), (*Materials, Preservation), (*Storage, Materials), (*Preservation, Humidity), (*Humidity, Controlled atmospheres), Metals, Organic materials, Corrosion, Degradation, Corrosion inhibition, Metal coatings, Moisture, Temperature.

This report deals mainly with the fundamental factors causing deterioration, the effect of climatic conditions on materials in storage, and the recommended storage conditions for different types of materials. It can be generally stated that metals deteriorate primarily by a process known as the electrochemical processes while organic materials generally undergo deterioration due to chemical reactions.

AD-600 565 Div. 14, 4
OTS Price $0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
ANALYSIS OF WOOD-PRESERVATIVES IN EXPOSED TEST PANELS.
Technical note
by R. W. Drisko and H. Hochman. (1964) 15p
Task Y R005 07 01 007
NCEL N583

Unclassified report

Descriptors: (*Wood, Preservation), (*Creosote, Preservation), (*Tar, Creosote), Sea water, Solvent extraction, Solutions, Chemical analysis, Chromatographic analysis, Spectroscopy, Environmental tests.

Wooden panels pressure impregnated with creosote or 70/30 creosote-coal tar solution were exposed for two, four, or six years in a submerged marine environment in a study conducted by the Oregon State University Forest Research Laboratory. These panels were extracted with solvent to determine the amounts of preservative remaining, and the extracts were analyzed to determine any chemical changes that had occurred to the preservatives. The analytical data obtained are presented in a series of tables. (Author)

AD-600 568 Div. 14, 4
OTS Price $0.50

Houghton (E. F.) and Co., Philadelphia, Pa.
DEVELOPMENT OF FIRE RESISTANT WATER BASED HYDRAULIC FLUIDS.
Bimonthly rept. no. 1
by Philip Rakoff, G. John Colucci and Robert K. Smith.
25 May 64, 13p
Contract NObs90269

Unclassified report

Descriptors: (*Hydraulic fluids, Lubricants), (*Lubricant additives, Glycols), (*Glycols, Water), Ignition, Molecular structure.

Water-glycol lubricants have been satisfactorily used by industry and the governmental agencies during the past twenty years in many hydraulic system applications. It was recently noted that the residual material remaining after the evaporation of the water in formulas specified under Military Specification H-22072 are susceptible to ignition. The main objective, therefore, was to impart fire resistance in both a finished lubricant and the non-aqueous residue. Targets included a flash point of greater than 450 F, a fire point of greater than 450 F and an autogenous ignition temperature of at least 900 F. (Author)

AD-600 415 Div. 14
OTS Price $0.50

Clapp (William F.) Labs., Inc., Duxbury, Mass.
SOUTHERN YELLOW PINE SAPWOOD PANELS WITH COPPER SULPHONATE.
Final rept.
12 Mar 64, 6p WFCL 12814
Contract NObs90044

Unclassified report

Descriptors: (*Wood, Protective treatments), (*Protective treatments, Liquid immersion tests), Liquid immersion tests, Sea water, Impregnation, Copper compounds, Sulfonates, Antifouling coatings, Marine borers, Preservation.

This report presents the results of seawater immersion tests. After six and one-half years exposure, unpainted panels treated with Copper Sulphonate showed remarkable resistance to marine borer activity. There were spasmodic evidences of embryonic Bankia and Pholads, but no penetration. All panels were in good condition at the conclusion of the test and their probable service life could be projected several more years. Copper Sulphonate treated panels at all retentions tested showed a definite antifouling influence over a 24 month period. Because of peeling and cracking, failure of Formula 121 antifouling paint began after a year's exposure and the paint was all gone by 24 months. The treated panel (now exposed uncoated) exhibited the same antifouling properties as the original uncoated treated panels. Formula 105 antifouling paint was more successful than the 121 antifouling paint. Cracking and peeling started at a year's exposure but the coating lasted up to 36 months. There was no evidence of marine borer attack in the coated panels as long as the paint was present. (Author)

AD-600 416 Div. 14
OTS Price $0.50

Clapp (William F) Labs., Inc., Duxbury, Mass.
MAHOGANY PLYWOOD AND RED OAK PANELS TREATED WITH COPPER FORMATE, TRIBUTYL TIN OXIDE AND CELCURE, PAINTED AND UNPAINTED.
Final rpt.
12 Mar 64, 12p WFCL 12830
Contract NObs90044

Unclassified report

Descriptors: (*Wood, Protective treatments), (*Protective treatments, Liquid immersion tests), Plywood, Sea water, Liquid immersion tests, Copper compounds, Formates, Metalorganic compounds, Tin compounds, Oxides, Impregnation, Preservation, Anitifouling coatings, Marine borers, Life expectancy.

The results of sea water immersion tests indicate that: Mahogany plywood, when impregnated with copper formate to a retention of 0.7% (as copper), showed a service life of approximately 4 1/2 years. Red Oak, when impregnated with copper formate to a retention of 0.7% (as copper), showed a service life of approximately 2 years. When the treated wood was coated with Navy formula 105 antifouling paint, the service life extended to 36 months. Red oak impregnated with Celcure to a retention of 1.5 pounds per cubic foot showed a service life of approximately 5 years. When coated with Navy antifouling formula 105 paint the probable service life extends beyond 5 years, as none of the coated panels showed any attack by marine borers at the conlusion of the test. Red oak impregnated with TBTO at the low retention of .15% pounds per cubic foot has a life of 12 months without any borer attack but will last 2 years before severe destruction takes place. When the treatment is increased to .6% per cubic foot the life expectancy increases two to four years. Again, when coated with antifouling formula 105 paint the length of time before initial borer attack is directly related to length of time the coating remains on the panels.

AD-600 432 Div. 14, 4
OTS Price $0.75

Frick Chemical Lab., Princeton Univ., N. J.
RUBBER ELASTICITY OF PRESWOLLEN POLYMER NETWORKS: HIGHLY CROSSLINKED VINYL-DIVINYL SYSTEMS.
ONR technical rept.
by M. C. Shen and A. V. Tobolsky. May 64, 29p RLT79
Contract Nonr1858 07, Proj. NR356 377,

Unclassified report

Descriptors: (*Acrylic resins, Elasticity), (*Vinyl plastics, Elasticity), Polymers, Esters, Glycols, Styrenes, Copolymerization, Organic solvents, Phthlates.

The rubber elasticity of highly crosslinked, presswollen network polymers was studied. Copolymers of tetraethylene glycol dimethacrylate with ethyl acrylate, n-butyl acrylate, methyl methacrylate and styrene covering the whole range of composition are investigated. Dioctyl phthalate is used to preswell the polymers up to 50% by volume. Both shear moduli and front factors are found to increase with increasing crosslink concentration, but decrease with increasing diluent content. Crosslinking efficiencies are determined by a modified Lashaek-Fox method. They are relatively invariant with the degree of preswelling. Factors contributing toward these observations are discussed. (Author)

AD-600 466 Div. 14
OTS Price $2.00

Aeronutronic, Newport Beach, Calif.
RESEARCH AND DEVELOPMENT ON ADVANCED GRAPHITE MATERIALS. VOLUME XIV. STUDY OF HIGH-TEMPERATURE TENSILE PROPERTIES OF ZTA GRADE GRAPHITE.
Technical documentary rept., Nov 60-Sep 62
by R. M. Hale and W. M. Fassell, Jr. Apr 64, 78p
Contract AF33 616 6915; Projs. 7350 and 7381;
Tasks 735002 and 738102
WADD TR61 72 V.14

Unclassified report

Descriptors: (*Graphite, Tensile properties), (*Refractory materials, Graphite), Heat treatment, Stresses, Pressure, Tables, High-temperature research.

The report describes the short time tensile properties of ZTA grade artificial graphite. These tensile properties were measured under the conditions of (a) various annealings, (b) various load rates, (c) various atmospheres, and (d) argon pressure from 5 to 150 psig at temperatures ranging to 2760 C (5000 F). The tensile strength was found to be dependent upon grain orientation, load rate, prior degassing treatment, and on surrounding gas pressure. (Author)

AD-600 514 Div. 14, 1
OTS Price $3.50

Kaman Aircraft Corp., Bloomfield, Conn.
COMPILATION AND ANALYSIS OF TEST DATA ON FIBER-GLASS-REINFORCED PLASTICS.
Rept. for 15 Jun-15 Nov 63
by James P. Waller and Robert L. Echols. Mar 64, 236p
Kaman R479
Contract DA44 177AMC90T
TRECOM TR64 9

Unclassified report

Descriptors: (*Rotor blades (Rotary wings), Materials), (*Glass textiles, Reinforcing materials), (*Plastics, Fatigue (Mechanics), (*Laminates, Helicopter blades), Wood, Vertical take-off planes, Short take-off planes, Composite materials.

AD-600 679 Div. 14, 12
OTS Price $1.50

Hercules Powder Co., Magna, Utah
AGING OF RACEWAY ADHESIVE.
Final rept.
20 May 64, 53p MT0258 7
Contract AF04 694 127

Unclassified report

Descriptors: (*Adhesives, Aging Materials), (*Aging (Materials), Rocket cases), Bonding, Degradation, Epoxy plastics, Third-stage motors, Guided missiles (Surface-to-surface).

The test was conducted to evaluate the effects of aging on the Armstrong A12T epoxy adhesive bonding system used on the raceway and case interface of the third stage Minuteman motor. A modification of the ASTM cleavage test was conducted. Seventy-two cylindrical section raceway samples from nine FSU motor cases were tested. The results of a statistical analysis revealed no evidence of physical deterioration of Armstrong A12T epoxy adhesive as a result of aging. The variation in shear strength and hardness, and the ratio of cohesive to adhesive failure that resulted from this test were attributed entirely to the variation in mix ratio, thoroughness of mix, surface preparation and method of application. (Author)

AD-600 703 Div. 14, 4
OTS Price $0.50

Monsanto Research Corp., Dayton, Ohio.
DEVELOPMENT OF FIRE-RESISTANT WATER BASE HYDRAULIC FLUID.
Bimonthly rept. no. 1, 1 Apr-31 May 64
by E. S. Blake, G. F. Deebel and G. A. Richardson. 31 May 64 16p
Contract NObs90270

Unclassified report

Descriptors: (*Hydraulic fluids, Flammability), (*Hydraulic fluids, Preparation), Flammability, Water, Solutions, Corrosion inhibition, Synthesis (Chemistry), Phosphates, Alkanes, Esters, Alkali metal compounds, Salts, Aromatic compounds, Shipborne.
Experiments were conducted, along with a complementary synthesis program, in an effort to establish the utility of phosphorus esters, phosphoramidates and partial ester (alkali) phosphates, and phosphonates as fire-resistant, pour point depressants. (Author)

AD-600 744 Div. 14, 4
OTS Price $2.60

Materials Research Lab., Pennsylvania State Univ., University Park.
STUDIES RELATED TO THE CRYSTALLIZATION OF GLASSES: CONTROLLED PHASE SEPARATION DUE TO METASTABLE LIQUID IMMISCIBILITY IN SIMPLE SILICATE SYSTEMS.
Technical rept. no. 2
by Bert Phillips and Rustum Roy. 15 May 64, 21p
Contract Nonr4089 00

Unclassified report

Descriptors: (*Glass, Crystallization), (*Silicates, Phase studies), Separation, Heat treatment, X-ray diffraction analysis, Oxides, Nucleation, Ceramic materials.

The tendency to separate metastably of compositions close to but outside of stable liquid immiscibility regions was studied for various simple silicate systems such as BaO-B2O3-SiO2, PbO-B2O3-SiO2, CaO-MgO-SiO2, and CaO-TiO2-SiO2. Another system, namely Na2O-B2O3-SiO2, where stable liquid immiscibility does not occur, but from which compositions are known to yield metastable separation was also studied as a reference. Small glass specimens were heat treated over a range of temperatures to determine the temperature range of metastable separation. Rods of similar composition were drawn and heat treated in the determined temperature range to develop phase separation. The products were studied by light and electron micrography, and x-ray diffraction. Phase separation due to metastable liquid immiscibility was affected in at least one composition from each system studied, whereas other compositions nearby did not produce this effect. Small amounts of other oxides could be added without inhibiting separation in those basic compositions where it occurred. The phase separation which developed caused no significant change in the transverse strength of these glasses. (Author)

AD-600 750 Div. 14, 1
OTS Price $0.50

Naval Air Engineering Center, Philadelphia, Pa.
THERMAL RADIATION RESISTANCE OF NON-METALLIC MATERIALS, INVESTIGATION OF; THERMAL RADIATION TESTS ON MIL-P-25690, STRETCHED ACRYLIC PLASTICS.
by J. H. Bowen, Jr. 2 Jun 64, 3p
NAEC M51CN:1rt 13550 3075

Unclassified report

Iterim report no. NAEC-AML-1954; forwarding of.

Descriptors: (*Acrylic resins, Thermal radiation), (*Aircraft canopies, Acrylic resins), Coatings, Contamination, Degradation.

It was concluded that MIL-P-25690 stretched acrylic canopy material conforms with current square wave pulse thermal radiation requirements and possesses a considerable margin of safety under these conditions. It is recommended that MIL-P-25690 material be examined using a 450 KT simulated weapon pulse where an irradiance of 25 to 30 cal/sq cm/sec occurs. It is also recommended that transparent or translucent canopy edge attachment constructions which are not protected by metal be tested since the MIL-P-25690 material would be prone to drawback in these areas. (Author)

AD-600 760 Div. 14, 25
OTS Price $1.00

Aeon Labs., Egham (England)
THE STRUCTURE OF GRAPHITIC MATERIALS -4.
Final technical rept., 1 Oct 63-29 Feb 64
by W. K. Armitage. 17 Mar 64, 40p
Contract DA91 591EUC1851

Unclassified report

Descriptors: (*Graphite, Crystal structure), (*Graphited materials, Single crystals), Heat treatment, Electron microscopy, Electron diffraction analysis.

The report discusses electron microscopic observations on synthetic graphite materials in both the ungraphitised and graphitised forms (heated at 2,500C) after various heat treatments and high temperature creep deformations. Moire fringe effects were reconciled with a turbostratic structure in which grains of graphite are subdivided into stacks of crystallites which are narrow in their c-direction and have small angular rotations in their respective basal planes. Electron diffraction patterns from this structure showed ring effects when the layer structure was normal to the electron beam, and elliptical effects when the beam was not normal to the layers. As the heat treatment temperature is raised the diffraction rings or ellipses become progressively spotty as the crystallites grow and minimise their misorientation in the basal planes, until finally, after heat treatment at 2,850C, single crystal spot patterns are observed indicating that either the misorientations almost disappeared or the crystallite size increased greatly. (Author)

AD-600 584 Div. 14, 20
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ON THE EFFECT OF BREMSSTRAHLUNG OF A 25 MEV BETATRON AND ULTRAVIOLET RAYS ON MINERAL OILS.
by S. Z. Kaplan and A. P. Bazin. 24 Apr 64, 14p
FTD TT64 224; TT 64 11690
Unclassified report

Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) 1963 v. 8 no. 8, p. 57-61.

Descriptors: (*Lubricants, Mineral oils), (*Mineral oils, Electric insulation), (*Mineral oils, Radiation chemistry), Bremsstrahlung, Ultraviolet radiation, Betatrons, Electromagnetism, Transformers, Viscosity, Infrared spectroscopy, USSR.

The purpose of the work is to study several physicochemical processes originating in mineral lubricating and electric insulating oils under the influence of electromagnetic radiations (betatron Bremsstrahlung ultraviolet rays). (Author)

AD-600 588 Div. 14, 1
OTS Price $2.00

Battelle Memorial Inst., Columbus, Ohio.
REFRACTORY CERAMICS OF INTEREST IN AEROSPACE STRUCTURAL APPLICATIONS - A MATERIALS SELECTION HANDBOOK.
Technical Documentary rept. for Apr 63-Apr 64
by J. F. Lynch, A. Rudnick, D. J. Bowers, F. C. Holden, and W. H. Duckworth. May 64, 71p
Contract AF33 657 8326; Proj. 7381; Task 738105
RTD TDR63 4102, S1
Unclassified report

Descriptors: (*Refractory materials, Aerospace craft), (*Ceramic materials, Intermetallic compounds), Handbooks, Selection, Aircraft equipment, Graphite, Melting, High temperature research.

This publication presents additional refractory--ceramic property data to supplement those published in the first edition of the (Materials Selection Handbook), issued in October, 1963, as RTD-TDR-63-4102 (AD-423 400). The materials covered are nonmetallic inorganic crystalline materials with melting points above 2730 F (1500 C), including intermetallic compounds and excluding glass, carbon, and graphite. The data are from literature published in 1961 and 1962. (Author)

AD-600 612 Div. 14
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE NATURE OF POLYAMIDE DESTRUCTION DURING CONTACT STRESSES.
by E. A. Fedorchuk. 13 Apr 64, 8p
FTD TT64 126; TT 64 11702
Unclassified report

Unedited rough draft trans. of Plasticheskie Massy (USSR) 1963, no. 5, p. 56-58.

Descriptors: (*Polyamide plastics, Fatigue (Mechanics), Fatigue (Mechanics), Degradation, Melting, Stresses, Surface properties, Loading (Mechanics), Plastics.

A roller machine was investigated in which an experimental polyamide roller revolved, practically without slippage, and pressed against a steel roller. Fatigue destruction of the working surface of polyamides at contact loads occurring during free rolling is of a deep nature and shows up in the form of material peeling off about the whole circumference of the roller. For hard materials, at contact loads and with lubrication, fatigue destruction shows up in the form of surface discoloration (so-called pitting or pock-marked wear). On caprone rollers, in spite of abundant lubrication, pitting was not observed. At increased loads and rpm's the models are destroyed as a result of increased heat generation in the material which leads to melting of the caprone in the maximal tangential stress zone. In testing the polyamides for contact endurance, it must be considered that their longevity depends upon load frequency whereas load frequency does not affect longevity of other types of plastics (such, for example, as phenoplast). (Author)

AD-600 631 Div. 14, 25
OTS Price $1.60

Stanford Research Inst., Menlo Park, Calif.
RESEARCH ON THE MECHANISM OF ABLATION OF POLYMERIC MATERIALS.
Quarterly rept. no. 2, 15 Aug-Nov 60
by D. L. Chamberlain, Jr., and Charles E. Lapple. 1 Dec 60, 12p
Contract AF33 616 7362, Proj. SRI SU3273, Task no. 73400
Unclassified report

Descriptors: (*Ablation, Polymers), (*Plastics, Ablation), (*Heat shields, Ablation), Combustion products, Models (Simulations), Heat transfer, Equations.

The char layer was chosen as a restricted model of a char-forming ablation resin. The equations governing heat and mass transfer into and out of this model were developed, and solution of these equations is in progress. An experimental program was developed around a simulated char layer. The apparatus and proposed experiments are described. (Author)

AD-600 644 Div. 14, 16, 32
OTS Price $0.50

Prevention of Deterioration Center, NAS-NRC, Washington, D. C.
EFFECT OF MICROORGANISMS ON NATURAL AND SYNTHETIC RUBBERS
comp. by Hans Janecka. 2 Dec 63, 12p PDC S63 047; PDL50015
Unclassified report

Descriptors: (*Bibliographies), Fungus deterioration), (*Fungus deterioration, Rubber), (*Rubber, Fungus deterioration), Microorganisms, Molds (Organisms), Synthetic rubber, Fungi.

A bibliography of 61 items, covering the fields of fungus deterioration, bacterial deterioration of rubber, and prevention of microbic deterioration.

AD-600 654 Div. 14, 13
OTS Price $1.00

Army Engineer Research and Development Labs., Fort Belvoir, Va.
RIGID FOAM PLASTICS SHELTERS, GREENLAND FIELD TESTS.
Technical rept., 6 Jul-2 Oct 61
by Ray H. Anderson. 6 Apr 64, 33p Task 1D643303D550 04
AERDL 1771TR
Unclassified report

Descriptors: (*Shelters, Arctic regions), (*Isocyanate plastics, Shelters), Greenland, Tests, Expanded plastics, Hazards, Heating.

The report covers the fabrication, erection, and testing of two polyurethane foam plastics buildings in Greenland. The investigation was conducted to evaluate the feasibility of fabricating rigid foam plastics buildings in the field. It is concluded that the fabrication of rigid foam plastics buildings in the field is feasible. (Author)

Handsheets of various commercial and experimental papermaking pulps were ovendried in special drying frames that controlled the amount of shrinkage. Unstretched handsheets and those stretched predetermined amounts were dried with various allowances for shrinkage and tested in tension to determine the influence of restraint during drying on the strength, modulus of elasticity, and strain to failure. The results show that modulus of elasticity is independent of the type of pulp but increases with the degree of restraint during drying, and with the density of the handsheets. Modulus of elasticity in the direction of restraint was found to vary as the cube of density. Tensile strength and strain to failure, on the other hand, were dependent on the type of pulp, as well as on the degree of restraint and density of handsheets. Tensile strength increased with the degree of restraint and appeared to vary as a power function with density changes. Strain to failure decreased as degree of restraint increased; it increased, however, with increasing density. (Author)

AD-600 876 Div. 14, 25
OTS Price $0.50

Aerospace Corp., Los Angeles , Calif.
EXPERIMENTAL METHOD OF DETERMINING THE VELOCITY OF SOUND IN GRAPHITE,
by A. F. DiGiacomo. 30 Apr 64, 19p TDR26y 4240 30 6
Contract AF04 695 269
SSD TDR64 80

Unclassified report

Descriptors: (*Graphite, Sound transmission), (*Sound transmission, Graphite), Velocity, Measurement, Cylindrical bodies, Nozzle inserts, Mechanical properties.

A new experimental technique was developed to determine the plate velocity of sound in graphite. This technique uses a thin cylindrical shell specimen and is less dependent on test specimen boundary condition than the standard beam vibration test. Results of the dynamic Young's modulus tests were in excellent agreement with static measurements made on the same test specimens. (Author)

AD-600 780 Div. 14, 4
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
STUDY OF THE ORIENTATION OF HIGHLY ORDERED REGIONS IN STRENGTHENED POLYVINYL ALCOHOL FIBERS.
by G. N. Afanas'eva and L. A. Vol'f. 28 Apr 64, 10p
FTD TT64 319

Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Khimii (USSR) 1963, v. 36, no. 7, p. 1587-1591.

Descriptors: (*Fibers (Synthetic), Polyvinyl alcohol), (*Polyvinyl alcohol, Molecular structure), Crystal structure, X-ray diffraction analysis, Tensile properties, USSR.

AD-600 811 Div. 14
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
FAOLITE FOR ANTI-CORROSION PROTECTION.
by L. Schwartz. 27 Apr 64, 12p
FTD TT63 1169, TT 64 11664

Unclassified report

Edited trans. of Revista de Chimie (Rumania) 1962, v. 13, no. 4, p. 231-233.

Descriptors: (*Plastics, Corrosion inhibition), (*Plastics, Production), Plastic coatings, Polymerization, Sheets, Mechanical properties, Rumania.

The work described represents a modest beginning in the fabrication and use of faolite in Rumania. At the present time, efforts are being increased for the purpose of perfecting the technological process for the fabrication and use of the material. Simultaneously, research is being pursued for producing faolite with furanic resins. (Author)

AD-600 813 Div. 14, 25
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio
PROPAGATION VELOCITY OF ULTRASONIC WAVES IN SOLIDS,
by N. F. Otpushchennikov. 28 Apr 64, 5p
FTD TT64 120, TT 64 11666

Unclassified report

Unedited rough draft trans. of Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki (USSR) 1953, v. 25, no. 1, p. 127-128.

Descriptors: (*Ultrasonic radiation, Propagation), Velocity, Measurement, Rock (Geology), Iron, Ceramic materials, Glass, Styrene plastics, Wood, USSR.

The propagation velocity of ultrasonic waves was measured by the wedge method in the following materials: marble (white), iron, porcelain (white), cast iron, glass (flint glass), polystyrene, rosin, and oak (against the grain).

AD-600 849 Div. 14
OTS Price $0.50

Forest Products Lab., Madison, Wis.
VENEER CUTTING AND DRYING PROPERTIES OF COTTONWOOD
Research note
Apr 64, 4p
FPL 044

Unclassified report

Reprint of Forest Products Laboratory Report 1766-3 originally issued Dec 50

Descriptors: (*Wood, Plywood), (*Wood, Moisture), (*Plywood, Production), Material separation, Lathes, Fibers (Natural), Containers.

AD-600 850 Div. 14
OTS Price $0.50

Forest Products Lab., Madison, Wis.
FOREST PRODUCTS LABORATORY NATURAL FINISH.
Research note
Apr 64, 6p
FPL 046

Unclassified report

Revision of Forest Products Laboratory Report 2096 of the same title, originally issued 1 Nov 57, and revised 1961.

Descriptors: (*Finishes and finishing, Wood), (*Weatherproofing, (Finishes and finishing), Oils, Films, Organic materials, Pigments.

The report describes a practical and durable exterior natural finish developed at the Forest Products Laboratory. The finish is classified as a modified semi-transparent oil-base penetrating stain that effectively retains much of the natural beauty of wood exposed to the weather. (Author)

AD-600 860 Div. 14
OTS Price $1.00

Forest Products Lab., Madison, Wis.
METHODS FOR EVALUATING SHEAR STRENGTH OF PLASTIC LAMINATES REINFORCED WITH UNWOVEN GLASS FIBERS.
Research note,
by Karl Romstad. May 64, 36p
Contract AF33 657 63 358,
FPL 033

Unclassified report

Descriptors: (*Laminated plastics, Shear stresses), (*Shear stresses, Laminated plastics), Glass textiles, Reinforcing materials, Measurement, Test methods.

Several methods were employed to evaluate the shear strength of plastic laminate panels 1/8 inch in thickness and reinforced with unwoven glass fibers. Shear values at 0 degrees to the fibers obtained by the Johnson shear and block-shear methods showed relatively good agreement. Shear strength values at 0 degrees to the fibers obtained from axial tests on notched specimens were found to depend upon the shear length between notches and the type of lateral restraint. Values obtained from short-span beam tests were affected by combined failures, depending on the shear span-depth ratio and the method of loading. Shear strength values at 90 degrees to the fibers by the block-shear method were about two-thirds of values obtained by the Johnson shear method and by compression tests of double-notched specimens with 1/8 inch between notches. Because of the stress concentrations that develop in each of these test methods, it is felt that none of the methods discussed here give shear strength value as high as would occur in pure shear. (Author)

AD-600 868 Div. 14
OTS Price $0.75

Forest Products Lab., Madison, Wis.
THE EFFECTS OF RESTRAINT DURING DRYING ON TENSILE PROPERTIES OF HANDSHEETS.
Research paper
by Vance C. Setterholm and Warren A. Chilson. Apr 64, 28p
FPL 11

Unclassified report

Descriptors: (*Sheets, Paper), (*Paper, Tensile properties), Elasticity, Strain (Mechanics), Moisture, Density, Wood pulp.

AD-600 161 Div. 15
OTS Price $0.50

RAND Corp., Santa Monica, Calif.
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEAMS OF LAPLACE TRANSFORM-IV: NONLINEAR EQUATIONS.
by R. E. Bellman, R. E. Kalaba and J. Lockett.
May 64, 15p, RM4088NIH
Grant PHS GM09608 02

Unclassified report

Descriptors: (*Nonlinear differential equations, Numerical methods and procedures), (*Numerical methods and procedures, Equations), (*Integral transforms, Mathematics), Difference equations, Partial differential equations.

It is shown that Laplace transform can be effective in the numerical solution of nonlinear functional equations. For illustrative purposes a nonlinear differential equation, a nonlinear differential-difference equation and a nonlinear diffusion equation are considered.

AD-600 162 Div. 15
OTS Price $0.50

RAND Corp., Santa Monica, Calif.
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM-V: MISMATCHED SYSTEMS OF LINEAR DIFFERENTIAL EQUATIONS.
by R. E. Bellman, R. E. Kalaba, and J. Lockett.
May 64, 13p, RM4089NIH
Grant PHS GM09608 02

Unclassified report

Descriptors: (*Differential equations, Numerical methods and procedures), (*Numerical methods and procedures, Equations), (*Integral transforms, Mathematics).

The numerical solution of a system of linear first-order ordinary differential equations with given initial conditions can be complicated by the fact that the real parts of the eigenvalues may be significantly different. It is shown in this Memorandum that the use of the Laplace transform and numerical inversion offers an attractive palliative to this problem. (Author)

AD-600 164 Div. 15
OTS Price $3.60

Stanford Univ., Calif. School of Humanities and Sciences.
A FAST DIRECT SOLUTION OF POISSON'S EQUATION USING FOURIER ANALYSIS.
Technical rept.
by R. W. Hockney. 14 Apr 64, 40p, CS6
Contract Nonr225 24, Grant NSF GP94

Unclassified report

Descriptors: (*Partial differential equations, Fourier analysis), (*Fourier analysis, Numerical methods and procedures), Matrix algebra, Digital computers, Geometry, Programming (computers).

The demand for rapid procedures to solve Poisson's equation has lead to the development of a direct method of solution involving Fourier analysis which can solve Poisson's equation in a square region covered by a 48 x 48 mesh in 0.9 seconds on the IBM 7090. This compares favorably with the best iterative methods which would require about 10 seconds to solve the same problem. The method is applicable to rectangular regions with simple boundary conditions and the maximum observed error in the potential for several random charge distributions is 5 x 10 to the minus 7th power of the maximum potential change in the region. (Author)

AD-600 214 Div. 15
OTS Price $3.60

California Univ., Berkeley.
ON BANACH ALGEBRA WITH SIGMA SYMBOL II.
Technical rept.
by M. Breuer and H. O. Cordes. Apr 64, 34p
Contract Nonr222 62

Unclassified report

Descriptors: (*Algebras, Theorems), *Operators (Mathematics), *Algebraic topology, Functional analysis, Topology, Groups (Mathematics).

A continuation of a discussion on questions concerning the Fredholm index in a Banach algebra of linear operators of a Hilbert space K, for which a sigma-symbol can be defined.

AD-600 278 Div. 15
OTS Price $0.50

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
ON THE ESTIMATION OF CONTRASTS IN LINEAR MODELS.
by Madan L. Puri and Subha Bhuchongkul. Apr 64, 13p
IMM nyu323
Contract Nonr285 38

Unclassified report

Descriptors: (*Statistical tests, Mathematical models), (*Linear systems, Mathematical models), Statistical distributions, Matrix algebra, Probability, Least squares method.

In linear models with several observations per cell, a class of estimates of all contrasts are defined in terms of rank test statistics or normal scores statistic. The asymptotic efficiency of these estimates relative to the standard least squares estimates, as the number of observations in each cell gets large, is shown to be the same as the Pitman efficiency of the rank tests on which they are based to the corresponding t-tests. (Author)

AD-600 308 Div. 15
OTS Price $0.50

Booz-Allen Applied Research, Inc., Chicago, Ill.
ON SAMPLE SIZE DETERMINATION.
Informal rept. no. 2
May 64, 6p BAARINC803 1R14
Contract DA18 108cm17174,

Unclassified report

Descriptors: (*Sampling, Population (Mathematics)), (*Population (Mathematics), Sampling), Statistical analysis.

A frequent request made prior to sampling involves the determination of the appropriate sample size necessary to estimate population characteristics (for example, the arithmetic mean) within a specified accuracy. Although the problem can be simply stated, the solution usually requires more a priori knowledge than is available. This informal memo suggests two approaches which could be used in estimating the mean value, mu, in a population containing N observations. The necessary assumptions are clearly stated. (Author)

15. MATHEMATICS

AD-600 005 Div. 15
OTS Price $0.50

Stanford Univ., Calif.
LIMIT DISTRIBUTIONS OF THE MINIMAX OF INDEPENDENT IDENTICALLY DISTRIBUTED RANDOM VARIABLES,
Technical rept. no. 50
by Herman Chernoff and Henry Teicher. 15 Apr 64, 29p
Contract Nonr225 72; Proj. NR042-993
Unclassified report

Descriptors: (*Statistical functions, Distribution theory), (*Real numbers, Sequences), (*Probability, Theorems), Statistical distributions.

The class of limiting distributions of the normalized minimax (or maximin) of independent identically distributed random variables is obtained and the domains of attraction of the three limiting types are characterized. Asymptotic independence of the minimax and maximin is also demonstrated. (Author)

AD-600 022 Div. 15
OTS Price $7.00

Center for Naval Analyses, Washington, D. C.
DIFFERENTIAL GAMES: A MATHEMATICAL THEORY WITH APPLICATIONS TO WARFARE AND OTHER TOPICS.
Research contribution
by Rufus Isaacs. 3 Dec 63, 605p
CNA RC1
Unclassified report

Descriptors: (*Game theory, Differential equations), (*Operations research, Warfare), (*Warfare, Operations research).

Broadly a differential game is one in which, as the action progresses, both the environment and the decisions available to the players are subject to a consistent, logical law, so that the problem is amenable to mathematical analysis. Usually the action is continuous and solutions can actually be obtained for a wide range of problems of extended conflict between two antagonists. The applications include various models of battles, pursuit and evasion games, dogfights, and other contests of maneuvering, such as football, and some aiming and evasion problems. By allowing one player to be passive, certain programming procedures can be optimized. A chapter is devoted to collision avoidance, in which the players cooperate rather than conflict. In what are termed games of degree the players respectively seek to maximize and minimize some numerically valued payoff. In games of kind the criterion is sharp, such as whether or not capture will occur in a pursuit situation. The two types have separate but related theories. The text concludes with chapters on the case of incomplete information and the practical aspects of applications to warfare. (Author)

AD-600 055 Div. 15, 30
OTS Price $0.75

Institute of Science and Tech., Univ. of Michigan, Ann Arbor.
THE REPRESENTATION PROBLEM FOR A GENERAL LINEAR DYNAMIC SYSTEM.
by W. A. Porter and J. P. Williams. May 64, 25p
IST 2900 463R
Contract DA36 039SC78801, AF33 657 11501,
Proj. 3D5801001
Unclassified report

Report on Project Michigan.

Descriptors: (*Control systems, Linear systems), (*Linear systems, Control systems), Difference equations, Differential equations, Transformations (Mathematics), Operators (Mathematics), Optimization.

The report defines a general linear system and shows that discrete, continuous, and discrete-continuous systems are expressions of the same mathematical structure. (Author)

AD-600 056 Div. 15, 19
OTS Price $0.50

Institute of Science and Tech., Univ. of Michigan, Ann Arbor.
A FUNCTIONAL DECOMPOSITION FOR LINEAR DISCRETE SYSTEMS.
bby W. A. Porter. May 64, 13p IST 2900 459R
Contract DA36 039SC78801, AF33 657 11501,
Proj. 3D5801001,
Unclassified report

Report on Project Michigan.

Descriptors: (*Functional analysis, Linear systems), (*Difference equations, Mathematical models), Navigation, Control systems, Differential equations, Topology, Theory.

The linear difference equation
delta sub k y(t sub k) = A(t sub k)y(t sub k) + B(t sub k) u(t sub k) y(t sub o) = y (o)
is reduced to a canonical operator theoretic form. This representation consists of a parameterized family of bounded linear transformations into a cartesian product of the underlying scalar field. It gives immediate results for the minimum energy control problem.

AD-600 101 Div. 15
OTS Price $0.50

Naval Ordnance Lab., White Oak, Md.
ON A MIXED BOUNDARY VALUE PROBLEM FOR LINEAR THIRD ORDER HYPERBOLIC PARTIAL DIFFERENTIAL EQUATIONS.
by Sherwood C. Chu.7 Apr 64, 18p
NONOL TR64 70 NOL MDM49
Unclassified report

Descriptors: (*Partial differential equations, Boundary value problems), (*Boundary value problems, Operators (Mathematics), Integral equations, Real numbers, Functions.

This report deals with a third order hyperbolic partial differential equation in n independent variables. The solution is required to satisfy certain boundary conditions on each of three surfaces. (Author)

AD-600 111 Div. 15
OTS Price $0.50

Army Materials Research Agency, Watertown, Mass.
A PROCEDURE FOR CALCULATING THE BESSEL FUNCTIONS J SUB NU (X)
Technical rept.
by Edward W. Ross, Jr. Mar 64, 17p
Proj. 1A010501B010,
AMRA TR64 06
Unclassified report

Descriptors: (*Bessel functions, Polynomials), (*Polynomials, Numerical analysis).

A procedure is studied for calculating the Bessel functions J sub nu (x) (nu real and non-negative) by utilizing their expansion in Laguerre polynomials. The errors, as estimated by the first neglected terms, are compared with the errors in the usual Bessel expansion for moderate x-values and are found to be more nearly uniform. The procedure appears to have some advantages over those now in use. (Author)

This report concerns itself with a theorem, a mathematical trick, and a conjecture which resulted from the study of a previous conjecture by F. J. Dyson. The theorem regards a certain summation over binomial coefficients. A special case of this theorem is then used in conjunction with a mathematical trick to prove a special case of Dyson's conjecture. Finally, a conjecture is proposed that is a modest generalization of Dyson's conjecture in the sense that the latter follows very simply. Some evidence in support of the conjecture is presented; however its validity remains an open question. (Author)

AD-600 458 Div. 15, 12
OTS Price $1.00

Aerospace Corp., Los Angeles, Calif.
ERROR DERIVATIVES FOR ELLIPTIC ORBITS.
by E. R. Lancaster. 26 Feb 64, 31p TDR269 4550 10 2
Contract AF04 695 269
SSD TDR63 255
Unclassified report

Descriptors: (*Elliptical orbit trajectories, Errors), (*Errors, Analysis), (*Partial differential equations), Orbital trajectories, Velocity.

When an increment of velocity is applied to an orbiting vehicle in an attempt to bring it to earth, errors will exist in the assumed position and velocity of the vehicle and in the applied velocity increment. If these errors are sufficiently small, a linear error analysis will suffice for determining their effects on quantities of interest at later times such as impact point coordinates. Formulas are derived in this report for the partial derivatives required for such an error analysis, assuming a non-rotating, spherical earth with no atmosphere. (Author)

AD-600 468 Div. 15
OTS Price $1.50

Statistical Lab., New York Univ., N. Y.
BISPECTRAL ANALYSIS OF STATIONARY TIME SERIES.
Scientific paper no. 18
by Paul Shaman. Jan 64, 63p
Contract Nonr285 17, Proj. S R009 01 01
Unclassified report

Descriptors: (*Series, Statistical analysis), (*Statistical analysis, Theorems), Statistical functions, Statistical distributions, Integral transforms, Analysis of variance, Probability, Stochastic processes, Mathematical models.

Several basic definitions are presented following the introductory remarks of the author. A brief survey of some results in spectral analysis is reported, aliasing is discussed, and an example of spectral analysis is given. Bispectral analysis is presented on the basis of Tukey's work. The symmetries of the bispectrum and third movement function are formalized as transformation groups. The problem of estimation is presented. Two examples for the derivation of the bispectrum are given as a Gaussian model, and the other a modified form of an example given by Tukey.

AD-600 471 Div. 15
OTS Price $0.50

Boeing Scientific Research Labs., Seattle, Wash.
BOUNDS FOR THE RANK OF THE SUM OF TWO MATRICES.
Mathematical note
by George Marsaglia. Apr 64, 13p D1 82 0343, Math 344
Unclassified report

Descriptors: (*Matrix algebra, Theorems), (*Statistical analysis, Theorems).

This paper gives upper and lower bounds on the rank of the sum of two matrices, and discusses their connection with the condition that rank be additive over a set of matrices. (Author)

AD-600 501 Div. 15
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE INSOLVABILITY OF THE PROBLEM OF HOMEOMORPHY.
by A. Markov. 13 Apr 64, 8p
FTD TT64 125, TT 64-11725
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, 1958, v. 121, no. 2, p. 218-220.

Descriptors: (*Topology, Theorems), Geometric forms, Groups (Mathematics), Numerical methods and procedures, Number theory, USSR.

The author considers the problem of homeomorphy to be the problem of searching for an algorithm which, for any two given polyhedrons, discerns whether or not they are homeomorphic. The polyhedrons are set combinatorially by their triangulation, making it possible to understand the term algorithm in its exact sense (as a normalized algorithm). The author has developed two theorems in the discussion of his work (1) For each natural number n greater than three, some n-dimensional manifold M to the nth power can be shown so that the problem of finding manifolds homeomorphic to manifold M to the nth power is insolvable; and (2) For any natural number n greater than 3, the problem of the homotopic equivalence of manifolds to manifold M to the nth power is insolvable.

AD-600 534 Div. 15
OTS Price $0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
A REMARK ON ORTHONORMAL BASES OF CONTINUOUS FUNCTIONS IN A HILBERT SPACE.
Group rept.
by T. S. Pitcher. 12 May 64, 7p LL 1964 26Contract AF19 628 500
ESD TDR64 328
Unclassified report

Descriptors: (*Functional analysis, Theorems), Functions, Topology, Set theory.

It is shown that an orthonormal set of continuous functions on a finite interval can always be completed by the addition of continuous functions if it is a finite set but cannot always be so completed if it is an infinite set. (Author)

AD-600 546 Div. 15, 25
OTS Price $2.25

Catholic Univ. of America, Washington, D. C. School of Engineering and Architecture.
EXPERIMENTAL SOLUTION OF SOME MIXED BOUNDARY VALUE PROBLEMS.
Interim rept. no. 4,
by A. J. Durelli and V. J. Parks. Apr 64, 87p
Contract Nonr2249 06
Unclassified report

Descriptors: (*Boundary value problems, Elasticity), (*Stresses, Mathematical analysis), (*Photoelasticity, Models (Simulation)), Strain (Mechanics), Loading (Mechanics), Mechanical properties, Shear stresses, Propellants.

Division 15 - MATHEMATICS

AD-600 309 Div. 15
OTS Price $0.50

Booz-Allen Applied Research, Inc., Chicago, Ill.
BIVARIATE REGRESSION WHEN BOTH VARIABLES ARE RANDOM.
Informal rept. no. 3
May 64, 13p BAARINC803 1R15
Contract DA18 108cm17174,

Unclassified report

Descriptors: (*Analysis of variance), (*Statistical analysis), Equations, Least squares method, Programming (Computers).

This memo presents the method of orthogonal regression and compares the standard linear regression procedures with orthogonal linear regression procedures. Care should be exercised in using the standard methods when both X and Y are subject to random variation. The computer program description and the fortran program are attached. (Author)

AD-600 337 Div. 15, 20
OTS Price $1.50

Naval Ordnance Lab., White Oak, Md.
PROPERTIES OF WEAK SOLUTIONS OF CERTAIN SINGULAR INTEGRO-DIFFERENTIAL EQUATIONS.
Mathematics Dept. rept.
by Avron Douglis. 8 Apr 64, 54p
NOL TR64 71 NOL MDM50

Unclassified report

Descriptors: (*Differential equations, Boundary value problems), (*Integral equations), Neutron, Transport properties, Equations, Theorems.

Equations include time dependent transport equations. Problem is for zero boundary data on a rectangular domain with given initial values. The weak solutions are shown to depend continuously upon and under certain conditions of positivity can be ordered like their initial data. Their first derivatives are estimated from initial data. (Author)

AD-600 373 Div. 15
OTS Price $0.75

RAND Corp., Santa Monica, Calif.
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM-VI: STOCHASTIC TIME-OPTIMAL CONTROL.
by R. E. Bellman, R. E. Kalaba, and J. Lockett. May 64, 21p RM4119PR
Contract AF49 638 700,

Unclassified report

Descriptors: (*Equations, Numerical analysis), (*Numerical analysis, Integral transforms), *Integral transforms, *Stochastic processes, Dynamic programming, Probability, Integrals, Nonlinear differential equations, Optimization.

The problem of transforming a given system from an initial state to a desired terminal state in the most efficient manner is a basic one in control theory, operations research, and routing in networks. This study deals with how to route so as to maximize the probability of arriving at the destination on time or earlier. The basic equations are derived via dynamic programming, and the principal computational tool is the numerical inversion of Laplace transforms. (Author)

AD-600 393 Div. 15, 25
OTS Price $1.75

Carlyle Barton Lab., Johns Hopkins Univ., Baltimore, Md.
ZERO-CROSSING INTERVALS OF RAYLEIGH PROCESSES.
Technical rept.
by A. J. Rainal. May 64, 68p AF108
Contract AF33 657 11029,Proj. 4036,Task 40361

Unclassified report

Descriptors: (*Probability), (*Statistical processes), Equations, Graphics, Statistical functions, Theory.

This report presents experimental results concerning probabilities and probability densities defined by the zero-crossing points of the envelope of a sine wave plus a Gaussian process. It is shown that these probabilities and probability densities are similar to the corresponding probabilities and probability densities defined by an associated Gaussian process. At present none of the probabilities or probability densities can be derived explicitly by analytical methods. The standard deviations associated with the probability densities are also presented. The first moments associated with the probability densities are compared with exact theoretical values. All other experimental results are compared with theoretical approximations. Probabilities and probability densities defined by the mathematical stationary points of the envelope of a sine wave plus a Gaussian process are also investigated. (Author)

AD-600 421 Div. 15
OTS Price $1.25

Stanford Univ., Calif.
MULTIPLE REGRESSION AND ESTIMATION OF THE MEAN OF A MULTIVARIATE NORMAL DISTRIBUTION.
Technical rept. no. 51
by Alvin J. Baranchik 4 May 64 41p
Contract Nonr225 72, Proj. NR042 993

Unclassified report

Descriptors: (*Statistical analysis), (*Statistical distributions), (*Statistical functions),

Two problems are presented in this study: estimation of the mean vector of a multivariate normal random variable, and estimating the regression function in the case of one predictand and at least three predictors. Estimators are given which have strictly lower risks than the corresponding maximum likelihood estimators for the following three problems: (a) estimation of the regression function; (b) estimation of the regression coefficients; and (c) estimation of the mean of the predictand when the means of the predictor variables are known. In each of the problems it is assumed that there are at least three predictor variables. A summary of previously known results for these three problems is given. The report concludes with some elementary modifications of the estimators computed earlier in the report. The author remarks that these modified estimators will frequently be of practical use.

AD-600 444 Div. 15
OTS Price $0.50

Harry Diamond Labs., Washington, D. C.
CERTAIN SUMMATIONS INVOLVING BINOMIAL COEFFICIENTS AND THEIR RELATION TO DYSON'S CONJECTURE.
by N. Karayianis. 20 Apr 64, 18p
Projs. 1A013001A039, A0200
HDL TR1217

Unclassified report

Descriptors: (*Binomials, Theorems), Power series, Series, Polynomials, Functions, Special functions (Mathematical), Number theory, Statistical analysis.

The theme of this report is the interplay of classes of operator-valued functions (E sub t, R sub lambda, V sub s), acting in a Hilbert space. In the prototype these functions are associated with a self-adjoint T : E sub t is the spectral function of T, R sub lambda is its resolvent, and V sub s is the unitary group e to the minus is T. In another circumstance, as studied by M. A. Naimark and A. V. Strauss, E sub t is the generalized spectral function of a symmetric operator, and R sub lambda is its generalized resolvent. In still another case one identifies V sub s as a semigroup of contraction operators - here important theorems carry the names of E. Hille, K. Yosida, and B. Sz.-Nagy. It is our thesis that by systematically developing, on a suitable level of generality, the interrelations among operator-valued functions (E sub t, R sub lambda, V sub s), one finds a unified approach to various specializations, obtains new, brief, and transparent proofs of the known facts concerning them, and uncovers new relations previously unnoticed. (Author)

AD-600 733 Div. 15
OTS Price $0.50

Mathematics Research Center, Univ. of Wisconsin, Madison
ON ESTIMATING LOCATION AND SCALE PARAMETERS FROM TRUNCATED SAMPLES
by Lionel Weiss. Mar 64, 15p MRC tsr459
Contract DA11 022ORD2059

Unclassified report

Descriptors: (*Sampling, Statistical analysis), (*Statistical analysis, Statistical tests), Statistical distributions, Statistical functions.

Asymptotically efficient estimators are developed for the problem of estimating a location and a scale parameter, using only the observations between the p and q sample quantiles.

AD-600 734 Div. 15
OTS Price $0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
CANONICAL REPRESENTATIONS OF CHAIN EVENTS
by Michael Yoeli. Mar 64, 20p MRC TSR462
Contract DA11 022ORD2059

Unclassified report

Descriptors: (*Sequences, Mathematical logic), *Algebras, *Transformations (Mathematics), Matrix algebra, Automata, Algebra.

So far studies of canonical representations for regular events have essentially been restricted to definite events. In this paper two additional classes of events, namely normal and uniform chain events, are introduced for which unique canonical representations are shown to exist. Most of the algebraic properties of regular events required in this study are derived from a rather general system of postulates which also applies e.g. to binary relations, Boolean matrices and their generalizations. (Author)

AD-600 735 Div. 15
OTS Price $1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
DECOMPOSITION OF CONES IN MODULES OVER ORDERED RINGS.
by Michael N. Bleicher and Hans Schneider. Apr 64, 40p MRC TSR463
Contract DA11 0220RD2059

Unclassified report

Descriptors: *Algebraic topology, *Algebras, *Matrix algebra, Set theory, Algebra, Prime numbers, Topology.

A proper cone is prime if it has no non-trivial direct summand. If a cone has a prime decomposition, then it is unique. Under certain chain conditions finite prime decompositions exist. In a wide class of modules- the PF-modules - every non-trivial summand of a cope lies in its boundary. Certain topological and ring theoretic notions arising from the above are studied in detail. Many clarifying examples and applications are given. In particular, some new results on Hermitian matrices are derived. (Author)

AD-600 736 Div. 15
OTS Price $0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
EFFICIENT USE OF NEWTON'S METHOD.
by Lydia R. Lohr and L. B. Rall. Mar 64, 12p
MRC TSR464
Contract DA11 022ORD2059

Unclassified report

Descriptors: *Numerical methods and procedures, *Iterative methods.

Theorems of L. V. Kantorovich are used to compare the overall efficiency of Newton's method and its modified form for the approximate solution of systems of equations. Criteria are given for choosing the method to achieve given accuracy in minimum time. This comparison and decision process may be incorporated directly into computer programs, and the basic analysis involved applies to any iterative process for which the convergence rate is known. (Author)

AD-600 737 Div. 15
OTS Price $0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
MATRIX RICCATI DIFFERENTIAL EQUATIONS.
by W. J. Coles. Mar 64, 16p MRC TSR465
Contract DA11 022ORD2059

Unclassified report

Descriptors: *Differential equations, *Matrix algebra.

The scalar Riccati equation y' = p(t) Y to the second power + q(t) y+r(t) has the following well-known properties: (I) If one solution is known, the complete solution is obtainable by two quadratures; (II) If two solutions are known, the complete solution is obtainable by one quadrature; (III) The cross-ratio of any four distinct solutions is constant. The scalar Riccati equation has been generalized to systems. Adoption of one or the other of two particular viewpoints leads to the matrix equations u' = Au - u alpha u (u is n x 1) and Y' = KY + L - YMY - YN (Y is n x m). This paper shows that there is an expression for the complete solution of equations of the first type, and that an expression for the complete solution of equations of the second type can be obtained by quadratures from the complete solution of the first type. Following this, properties corresponding to (II) and (III) are established for the first equation. (Author)

AD-600 738 Div. 15
OTS Price $0.75

Mathematics Research Center, Univ. of Wisconsin, Madison.
SYMMETRY AND ESSENTIAL SYMMETRY IN GRADUATED FIELDS.
by Walter Strodt. Mar 64, 26p, MRC TSR468
Contract DA11 022ORD2059

Unclassified report

Descriptors: *Algebraic topology, *Set theory, *Functions, Numbers, Algebra, Topology, Nonlinear differential equations.

This paper deals with means of applying known displacements and known stresses to the boundaries of models used in experimental stress analysis. The solution of several problems in which means are used, is reviewed. The evaluation of the stresses, strains, and displacements in the field is conducted using several experimental stress analysis methods. Particular emphasis is placed on the methods used to study several kinds of shrinkage problems with two- and three-dimensional photoelasticity. The application of these methods is illustrated with examples, several of which are in the field of stress analysis of solid propellant grains. (Author)

AD-600 553 Div. 15
OTS Price $0.75

Cowles Foundation for Research in Economics, Yale Univ., New Haven, Conn.
CONVEXITY IN THE THEORY OF CHOICE UNDER RISK.
Discussion paper.
by Menahem E. Yaari. 21 May 64, 21p Cowles DP171
Contract Nonr3055 00

Unclassified report

Descriptors: (*Convex sets), (*Probability), (*Real numbers), Set theory.

AD-600 566 Div. 15, 22
OTS Price $0.50

Boeing Scientific Research Labs., Seattle, Wash.
SOME PROBLEMS INVOLVING CIRCULAR AND SPHERICAL TARGETS.
by George Marsaglia. Apr 64, 19p DI 82 0342

Unclassified report

Descriptors: (*Targets, Spheres), (*Tactical weapons, Operations research), (*Probability, Measure Theory).

This article is concerned with some problems which occur in certain tactical considerations: how should one place k circles (spheres) in the plane (3-space) so that their union has the greatest standard normal probability measure, that is, so as to maximize the probability that a random normal point will fall in one or more of the circles (spheres). For $k > 3$ the problem seems hopeless, (except for certain special situations); the case for $k = 3$ is still unresolved and is being worked on by a number of investigators, and the case for $k = 2$ is solved completely in this paper. The results for $k = 2$ have some practical value when applied to actual problems arising in tactical considerations, and some theoretical value, as a method of attacking the problem for $k > 3$. (Author)

AD-600 600 Div. 15, 8
OTS Price $7.60

Lockheed Missiles and Space Co., Sunnyvale, Calif.
OPTIMAL ADAPTIVE ESTIMATION OF SAMPLED STOCHASTIC PROCESSES.
Technical rept.,
by D. T. Magill. May 64, 78p LMSC6 74 64 24
Contract Nonr225 24; Proj. NR373 360

Unclassified report

Report on Electronics.

Descriptors: (*Stochastic processes, *Mathematical prediction, *Vector analysis), Optimization, Functional analysis, Recussive functions, Statistical processes, Mathematical models, Linear systems.

This work presents an adaptive approach to the problem of estimating a sampled, scalar-valued, stochastic process described by an initially unknown parameter vector. Knowledge of this quantity completely specifies the statistics of the process, and consequently the optimal estimator must learn the value of the parameter vector. In order that construction of the optimal estimator be feasible it is necessary to consider only those processes whose parameter vector comes from a finite set of a priori known values. Fortunately, many practical problems may be represented or adequately approximated by such a model. The optimal estimator is found to be composed of a set of elemental estimators and a corresponding set of weighting coefficients, one pair for each possible value of the parameter vector. This structure is derived using properties of the conditional mean operator. For gauss-markov processes the elemental estimators are linear, dynamic systems, and evaluation of the weighting coefficients involves relatively simple, nonlinear calculations. The resulting system is optimum in the sense that it minimizes the expected value of a positive-definite, quadratic form in terms of the error (a generalized mean-square-error criterion). Because the system described in this work is optimal, it differs from previous attempts at adaptive estimation, all of which have used approximation techniques or suboptimal, sequential, optimization procedures. (Author)

AD-600 686 Div. 15
OTS Price $1.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
ON THE PROBLEM OF (P, Q) ANALYTIC FUNCTIONS OF A COMPLEX VARIABLE AND THEIR APPLICATIONS.
by G. N. Polozhii. May 64, 51p
RSIC 172, TT 64 11682

Unclassified report

Trans. of Revue de Mathematiques Pures et Appliquees (Rumania) 1957, v. 2, p. 331-361.

Descriptors: *Functions, *Complex variables, Differential equations, Integrals, Boundary value problems.

AD-600 731 Div. 15
OTS Price $2.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
APPLICATIONS OF THE CALCULUS FOR FACTORIAL ARRANGEMENTS II: UNEQUAL NUMBERS IN THE ANALYSIS OF VARIANCE.
by W. T. Federer and M. Zelen. Mar 64, 77p MRC tsr411
Contract DA11 0220RD2059

Unclassified report

Descriptors: *Combinatorial analysis, *Analysis of variance, *Number theory, *Statistical analysis.

This paper develops a new theory for the analysis of disproportionate numbers of observations in multi-factor classifications. The principal theoretical result enables a generalized sum of squares in the analysis of variance to be written explicitly. Use of this result leads to minimum calculations compared to other methods now in general use. A numerical example is presented illustrating the calculations. (Author)

AD-600 732 Div. 15
OTS Price $1.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
SPECTRAL MEASURES, GENERALIZED RESOLVENTS, AND FUNCTIONS OF POSITIVE TYPE
by Robert McKelvey. Apr 64, 55p MRC tsr458
Contract DA11 0220RD2059

Unclassified report

Descriptors: *Functional analysis, *Operators (Mathematics), *Functions, *Measure theory, Theorems, Complex variables, Topology.

16. MEDICAL SCIENCES

AD-600 003 Div. 16
OTS Price $0.50

Washington Univ., St. Louis, Mo. School of Medicine.
STUDIES ON THE NATURE OF THE ABNORMALITIES IN SOLUTE AND WATER EXCRETION IN ACUTE TUBULAR NECROSIS AND OTHER RENAL DISEASES.
Final rept., 1 Oct 62-30 Nov 63
by Neal S. Bricker. 5 May 64, 10p
Contract DA49 007MD772

Unclassified report

Descriptors: (*Kidneys, Diseases), (*Diseases, Kidneys), Absorption (Biological), Adaptation (Physiology), Adenosine phosphates, Body fluids, Dogs, Electrolytes (Physiology), Excretion, Membranes (Biology), Necrosis, Sodium, Urine, Urinary system, Water.

The functional capacity of diseased kidneys was studied by including intrinsic renal diseases in one kidney of dogs. Electrolyte transport capacity of membranes was measured for frog skin and the urinary bladder of the turtle. The functioning of the diseased and the control kidney in the dogs were measured simultaneously. In all types of renal disease, functional competence. Glomerular filtration rate (GFR) was uniformly decreased. The decrease in several tubular functions was proportional to the GFR decrease. These ratios suggest that the glomerulo-tubular balance is the same in deseased and normal kidneys. Glucose titration showed no greater splay in the diseased kidneys than in the controls. The sodium, chloride, bicarbonate, and water excretion were qualitatively similar, but the diseased kidney excreted a greater fraction of the filtered load of these substances. Electrolyte transport by isolated frog skin and turtle bladder indicate that the sodium pump could operate electrogenically. Adenosine triphosphate (ATP) levels were well maintained under anaerobic conditions. The direct source of the energy for the sodium pump might be a high energy intermediate rather than ATP.

AD-600 077 Div. 16
OTS Price $0.75

Chicago Univ., Ill. Medical School.
EFFECT OF OXYGEN INHALATION ON RESPONSES TO COLD EXPOSURE.
Annual progress rept. 1 Oct 62-30 Sept 63
by D. M. MacCannon 15 May 64, 26p
Grant DA MD49 193 62G43

Unclassified report

Descriptors: (*Oxygen consumption, Exposure), (*Cold environment, Oxygen consumption), Skin, Man, Shivering, Thresholds (Physiology), Body temperature, Sensory mechanisms, Adaptation (Physiology), Reflexes, Blood chemistry, Blood circulation.

The effect of oxygen inhalation on cutaneous thresholds for cold sensation was determined by exposing a 50 sq. cm area on the chest to a radiant cold source of variable intensity for 2 second intervals in 11 healthy 23 to 26 year old nude subjects at two ambient temperatures. Oxygen breathing produced a similar significant increase in cold thresholds in both cool (22.4to26.5C) and warm (36.6to39.3C) environments. Observations at warm ambient temperatures substantiate the oxygen effect independent of suspected reflex vasoconstriction in the cool environment. These experiments confirm the cold threshold raising effect of oxygen inhalation and emphasize the danger of relying solely on physical calculations of the intensity of a thermal stimulus. Indirect evidence that oxygen inhalation hinders carbon dioxide transport continues to accumulate. Instrumentation analyses suggest methods for improving polarographic measurements for po2 and for the infrared carbon dioxide analyzer.

AD-600 104 Div. 16
OTS Price $0.50

Emory Univ., Atlanta, Ga. School of Dentistry.
ALKALINITY VS. PHOSPHATE AND OTHER DIETARY FACTORS IN THE CONTROL OF DENTAL CARIES.
Final progress rept.
by John Haldi and Winfrey Wynn. 27 Apr 64, 8p
Contract DA49 007MD675

Unclassified report

Descriptors: (*Teeth, Diseases), *Diet, pH, Saliva, Salts, Electrolytes (Physiology), Phosphorylation, Phosphorus, Molybdenum, Boron, Vanadium.

In previous studies, it has been found that 3% Na2CO3 added to a cariogenic diet raised the pH of the diet from 6.0 to 8.9 and also reduced its cariogenicity. The addition of lactic acid to the diet in an amount which lowered the pH to 4.7 did not make the diet more cariogenic. An attempt was made to determine whether the reduction in the cariogenicity of diet as a result of adding Na2CO3 was due to the alkalinization of the diet or to the solubilizing action of Na2CO3 on the insoluble phosphate in the diet. These studies were unsuccessful as no method was found for raising the pH of the diet without liberating phosphorus. When the trace elements molydenum, vanadium, boron, and tin were added to the diet or drinking of albino rats no cariostatic effect was produced.

AD-600 123 Div. 13
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A CARDIOCYCLOGRAPH.
by I. T. Akulinichev, E. B. Babskii, G. G. Gel'shtein, B. B. Lakunin, and G. V. Moskalenko. Mar 64, 11p
FTD TT63 1189, TT 64 11653

Unclassified report

Unedited rough draft trans. of mono. Elektronika v Meditsine (Electronics in Medicine) Moscow/Leningrad, 1960, p. 55-61.

Descriptors: *Electrocardiography, Heart, Medical equipment Diagnostic agents, Electronic equipment, Pulse rate, Blood vessels.

The cardiocyclograph is an electronic instrument which records electrocardiograms which show simply and clearly a time analysis of the curve being recorded. It also indicates changes in the rhythm of the heart contractions. The electrocardiograph is recorded on photographic paper in the form of segments corresponding to one heart-contraction cycle. This instrument can be used to record the pulse of peripheral arteries by use of a piezosensor connected to the input of the electrocardiographic amplifier. Simultaneous electrocardiograms and continuous visual observations of the state of cardiac activity can be made by means of the electron beam tube of the input unit.

AD-600 124 Div. 16, 8
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EVALUATION OF DIFFERENTIAL AMPLIFIER CIRCUITS IN ELECTROPHYSIOLOGICAL RESEARCH.
by D. N. Menitskii. 23 Mar 64, 9p
FTD TT63 1196, TT 64-11654

Unclassified report

Unedited rough draft trans. of mono. Electronika v Meditsine (Electronics in Medicine) Msocow/Leningrad, 1960, p. 143-148.

Division 15 - MATHEMATICS

In the asymptotic theory of non-linear differential equations it is frequently important to have a precise asymptotic description not only of the elements of the coefficient field, but also of the real parts of these elements. To secure such a description the present paper introduces into the theory of graduated fields a concept of Schwarzian symmetry, and a certain concept of topological closure, and, depending upon both of these, a concept of essential symmetry. The central result presented is the following theorem: If F sub 0 is essentially symmetric, so is the algebraic closure of F sub 0. This is proved in an abstract setting which uses and develops the author's theory of graduated fields, as introduced in On the algebraic closure of certain partially ordered fields. Trans. Amer. Math. Soc. vol. 105 (1962) pp. 229-250.

AD-600 739 Div. 15
OTS Price $0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON THE ASYMPTOTIC DISTRIBUTION OF THE LARGEST SAMPLE SPACING
by Lionel Weiss. Apr 64, 20p MRC TSR471
Contract DA11 022ORD2059

Unclassified report

Descriptors: *Statistical distributions, *Statistical functions, *Probability, Theorems, Statistical tests.

The limiting distribution of the largest sample spacing generated by independent identically distributed random variables is obtained, under mild conditions on the common distribution. Applications are suggested. (Author)

AD-600 740 Div. 15
OTS Price $0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
BLOCK RELAXATION BY COMPUTER,
by J. Barkley Rosser. Apr 64, 11p. MRC TSR477
Contract DA11 022ORD2059

Unclassified report

Descriptors: (*Programming (Computers), Numerical analysis), (*Numerical analysis, Programming (Computers)), *Combinatorial analysis, Difference equations, Partial differential equations, Boundary value problems.

Let it be required to find the values phi sub i j at grid points, for a grid of squares of side h, of the solution to a difference equation approximation to Laplace's equations in a region, being given values on the boundary. For computer purposes, we define a block relaxation as follows. Given estimates of phi sub i j on the boundary of a block, one determines the solution of the difference equation inside the block for the given values of phi sub i j on its boundary, and takes these as the new estimates for the phi sub i j at points inside the block. One can take the blocks to be squares of side 2Nh, and then the successive relaxations are uniquely determined if estimates for phi sub i j are available only at points of a filagree consisting of the grid points on a network consisting of horizontal and vertical lines which are separated by a distance of Nh. By restricting attention exclusively to filagree points until convergence is complete, the demands on computer memories are reduced by factors as great as eight. This holds out the promise of dealing with problems of a size hitherto unmanageable. The method is easily extended to the solution of Poisson's equation. (Author)

AD-600 778 Div. 15, 12, 25
OTS Price $0.75

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A NEW FORM OF EQUATIONS OF SATELLITE MOTION AND ITS APPLICATION TO INVESTIGATING KEPLERIAN-LIKE MOTION.
by G. E. Kuzmak and Yu. M. Kopnin. 28 Apr 64, 22p
FTD TT63 1201; TT 64 11737

Unclassified report

Unedited rough draft trans. of Zhurnal Vychislitel'noi Matematiki i Matematicheskoi Fiziki (USSR) 1963, v. 3, no. 4, p. 730-741.

Descriptors: (*Differential equations, Integration), (*Satellites (Artificial), Motion), (*Equations, Motion), Vector analysis, Trajectories, Perturbation theory, Celestial mechanics, Mechanics, Numerical methods and procedures.

Descriptors: *Psychophysiology, (*Space perception, Theory), Conditioned reflex, Time, Physiology, Rhythm (Biology), Stimulation, Proprioception, Central nervous system, Sensory mechanisms, Sense organs.

The problem of space-time relationships and their perception by human and animal sense organs and brain, developed by A. A. Ukhtomskiy in his study of the dominant as a systemic behavior reaction, has not been sufficiently studied. His ideas concerning the chronotope were scattered in various articles and monographs. Unfortunately he didn't systematize them and they have been almost unnoticed by physiologists, psychologists, and philosophers. This article tries to systematize his published and unpublished material on the chronotope, and to concisely characterize the dominant principle and compare his reasoning concerning the interaction between the dominant and perception of the chronotope by human and animal sense organs and brain.

AD-600 171 Div. 16
OTS Price $0.75

Naval Radiological Defense Lab., San Francisco, Calif.
THE LONG TERM EFFECTS OF NEUTRON EXPOSURE ON BONE GROWTH IN THE RAT.
by R. D. Phillips and D. J. Kimeldorf. 25 Mar 64, 22p
Task MR005 08 5201
NRDL TR737

Unclassified report

Descriptors: (*Bone, Radiation effects), (*Radiation effects, Neutrons), Radiobiology, Radiological dosage, Dosage, Dose rate, Radiation effects, Aging (Physiology), Growth, Legs, Rats, Fast neutrons.

The long term effect of fast neutron exposure on bone growth in terms of femur, tibia and tail length was studied in male rats using a roentgenographic measurement technique. There was a growth deficit evident in all three structures of irradiated animals at the end of life span. The magnitude of the reduction in bone length was dependent upon the radiation dose and the age of the animal at the time of exposure. For animals exposed at the same age, the magnitude of the bone length deficit varied directly with dose. For animals exposed to the same dose, the effect was greater in juvenile animals than it was in young adult animals. The greater stunting effect of neutron exposure on bone growth in animals exposed as juveniles compared to animals exposed as young adults was explained on the basis of the faster growth rate of the juvenile animals at the time of exposure. (Author)

AD-600 222 Div. 16, 8
OTS Price $5.60

Bolt Beranek and Newman Inc., Cambridge, Mass.
TRANSMISSION AND CODING OF INFORMATION IN AUDITORY NERVOUS SYSTEM.
Final rept. 8 Jan 62-14 Feb 64.
14 Feb 64, 55p, BBN1127
Contract AF49 638 1142
AFOSR 64 0966

Unclassified report

Descriptors: (*Psychoacoustics, Hearing), (*Hearing, Psychoacoustics), *Sleep, Auditory nerve, Coding, Bionics, Auditory signals, Stimulation, Cerebral cortex, Cerebrum, Psychophysiology, Speech recognition, Neuromuscular transmission, Sensory mechanisms, Sensory perception, Pattern recognition.

Research conducted on the electrophysiological aspects of the auditory nervous system, the neural activity during learning, and the different stages of alertness during sleep is outlined. Summaries are presented for the following research studies: (1) Long Duration Auditory Evoked Potentials in Man During Sleep, (2) The Effects of Midbrain Lesions on Cortical Responses to Acoustic Stimuli, (3) Differences in the Functions of the Two Cerebral Hemispheres, (4) The Use of Anatomical and Physiological Evidence in Theory Construction, and (5) Temporal Pattern Discrimination in Lower Animals and Its Relation to Language Perception in Man.

AD-600 227 Div. 16
OTS Price $8.10

London Univ. (England).
RESEARCH ON DRUGS ON NEURONAL TRANSMISSION.
Final rept.
by J. P. Quilliam. Jan 64, 88p
Contract AF6105225
AFOSR 64-0951

Unclassified report

Descriptors: (*Drugs, Neuromuscular transmission), (*Neuromuscular transmission, Drugs), *CNS depressants, Central nervous system, Autonomic nervous system, Autonomic agents, Cholinesterase inhibitors, Local anesthetics, Acetylcholine, Stimulation, Nerve cells, Nerve fibers, Aldehydes, Barbiturates, Pentanols, Piperidines.

The actions of centrally active drugs and related compounds on transmission across the synapses of the superior cervical ganglion of the cat, rabbit and rat have been studied because these synaptic junctions may be regarded as being closely allied to those seen between central neurones. Experiments on the cat ganglion were made in vivo with repetitive preganglionic nerve stimulation while those on the isolated ganglia of the rabbit and the rat were made in vitro and usually involved the application of single stimuli to the preganglionic trunk with recording of the evoked ganglionic or postganglionic action potentials. The results are summarized in 2 parts firstly, quantitative findings and secondly, qualitative observations with particular reference to modes of action. (Author)

AD-600 228 Div. 16
OTS Price $0.50

Woodard Research Corp., Herndon, Va.
SCREENING OF POTENTIAL RADIO-PROTECTIVE COMPOUNDS IN MICE.
Annual progress rept., 15 Mar 63-15 Feb 64
by Geoffrey Woodard. 12 May 64, 9p
Contract DA49 193MD2405

Unclassified report

Descriptors: (*Radioprotective agents, Test methods), (*Biological assay, Radioprotective agents), Drugs, Dosage, Radiological dosage, Radiation effects, Radiation sickness, Inhibition, X rays, Radiation tolerance, Toxicity, Mice.

A total of 701 coded compounds were screened for their potential radio-protective potency in mice in accordance with the following method: (1) An approximate maximum tolerated dose of each coded test compound was determined by administering the compound intraperitoneally in graded doses to groups of mice and these mice observed for pharmacologic and toxicologic signs. Survivors at seven days were subjected to gross necropsy, also. (2) The test compound at this dose was then administered intraperitoneally to groups of six mice. At an interval when the compound was estimated to be most pharmacologically active, these mice were exposed to radiation from a Maxitron 300 X-ray unit at a dose which was calculated to be the LD 100/30 in similar groups of untreated animals. Untreated animals were exposed to this dose of radiation at the same time thereby serving as controls. The estimated protection offered by administration of the test compound was then determined, as compared with control values, and tabulated. (Author)

AD-600 229 Div. 16
OTS Price $0.50

Woodard Research Corp., Herndon, Va.
TESTING OF ANTIRADIATION AGENTS IN MONKEYS, AS AMENDED.
Annual progress rept., 1 Jul 63-1 May 64
by Geoffrey Woodard. 15 May 64, 6p
Contract DA49 193MD2458

Unclassified report

Descriptors: (*Circuits, Current amplifiers), (*Current amplifiers, Voltage), (*Physiology, Electric currents), Cathodes (Electron tubes), Cascade structures, Feedback, Noise, Diagnosis, USSR.

For quality characteristics of the individual differential stages, it is useful to examine two quantities: (a) the rejection coefficient which represents the relation of the amplification of the cascades with and without consideration of negative feedback on cathode resistance. This coefficient increases with the coupling of several additional differential cascades. (b) the symmetry coefficient, which shows the degree to which the paired tubes are matched in a symmetrical cascade. It gives the amount of out-of-phase voltage at the output of the cascade when inphase voltage is applied to the input terminals. Since the out-of-phase signal does not change with coupling of additional cascades, this coefficient is determined by the first cascade. The quality of a multicascade differential amplifier can be characterized by the noise suppression coefficient, which depends on both coefficients cited above. From the point of view of their use in clinical physiological experiments and diagnoses, investigation shows that because noise voltage under actual conditions is not absolutely identical, large coefficients of noise suppression can be realized only by additional balancing of these voltages at the input of the amplifiers. (Author)

AD-600 129 Div. 16
OTS Price $0.50

Aerospace Information Div., Washington, D. C.
SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS. PT. A. BIOSCIENCES: COMPILATION OF ABSTRACTS.
Rept. no. 17
6 May 64 19p
AID P64 33, TT 64-11642

Unclassified report

Descriptors: (*Life support, Abstracts), (*Abstracts, Life support), (*Space biology, Radiation effects), Space medicine, Radioprotective agents, Radiobiology, Physiology, Perception, Amino acids, Fatty acids, Bibliographies, USSR.

Included are abstracts on space medicine and biology, space physiology, and perceptual physiology.

AD-600 133 Div. 16
OTS Price $10.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
GENERAL ELECTROPHYSIOLOGY.
by D. S. Vorontsov. 27 Feb 64, 826p
FTD TT63 580, TT 64 11650

Unclassified report

Unedited rough draft trans. of mono. Obshchaya Elektrofiziologiya, Moscow, 1961 (487p).

Descriptors: (*Physiology, Electric currents), *Biophysics, Cells (Biology), Tissues (Biology), Electroencephalography, Nervous system, Textbooks.

This book is intended for physiologists and physicians who use electrophysiological methods in laboratory and clinical practice, graduate students, and undergraduates at medical institutes and in biology departments. The physiochemical nature of bioelectric potentials is considered, the contemporary theoretical concept of these potentials are presentd, and the mass of data obtained during the past 20 years by intracellular recording of electrical potentials is described. A great deal of attention is given to the functional importance of bioelectric potentials in the activity of the nervous system.

AD-600 147 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
APPARATUS FOR ELECTRONARCOSIS.
by B. V. Bolotov and N. M. Shcherbakov. 23 Mar 64, 6p
FTD TT63 1197, TT 64 11647

Unclassified report

Unedited rough draft trans. of mono. Elektronika v Meditsine (Electronics in Medicine) Moscow/Leningrad, 1960, p. 239-241.

Descriptors: (*Medical equipment, Anesthesia), (*Anesthesia, Medical equipment), (*Electrotherapy, Anesthesia), Neurology, Psychiatry, USSR.

AD-600 148 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
INSTRUMENT FOR RECORDING THE PULSE WAVES AND DETERMINING THE BLOOD PRESSURE IN ANIMALS.
by A. A. Kudryavtsev, 26 Mar 64, 6p
FTD TT63 1176, TT 64-11648

Unclassified report

Unedited rough draft trans. of Veterinariya (USSR) 1959 (v. 36) no. 3, p. 76-78

Descriptors: (*Medical equipment, Blood pressure), (*Medical equipment, Blood pulse), (*Veterinary medicine, Medical equipment), Cardiography, Animals, Meters, USSR.

AD-600 151 Div. 16
OTS Price $2.60

United Research, Inc., Cambridge, Mass.
THE ROLE OF THE PINNA IN HUMAN LOCALIZATION.
by Dwight W. Batteau (Tufts Univ.), Jan 64, 30p
Contract N123 60530 32279A

Unclassified report

Descriptors: (*Ear, Anatomy), (*Hearing, Sensory mechanisms), Auditory signals, Sound, Sound transmission, Auditory perception, Auditory acuity, Attention, Sound pitch, Neuromuscular transmission, Anatomical models.

In theory, the role of the pinna in localization is to introduce, by means of delay paths, a transformation of the incoming signal which is mentally inverted to provide attention, and that the inverse transform required defines the location of the sound source. It may be that relatively simple systems of delays, attenuations, and signed additions may be used to construct the inverse transformations, and that these could easily be realized in the nervous system. It may be further theorized that the same method of constructing inverse transformations can apply to monaural and binaural localization, sound recognition, and the utilization of reverberation. (Author)

AD-600 157 Div. 16
OTS Price $1.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PRINCIPLE OF THE DOMINANT AND A. A. UKHTOMSKII'S CONCEPT OF THE CHRONOTOPE (TIME-SPACE COMPLEX).
by V. L. Merkulov. 25 Mar 64, 33p
FTD TT63 1086, TT64-11646

Unclassified report

Unedited rough draft trans. of Uspekhi Sovremennoi Biologii (USSR) 1959, v. 47, no. 2, p. 204-219

AD-600 282 Div. 16
OTS Price $0.50

Maryland Univ., Baltimore. Dental School.
INVESTIGATION OF THE MECHANISM OF ACTION OF RYANODINE ON MAMMALIAN SKELETAL MUSCLE.
Final rept. 1 Nov 61-30 Apr 63.
by John I. White. 8 May 64, 9p
Grant D CML18 108 37

Unclassified report

Descriptors: (*Skeletal muscle relaxants, Alkaloids), (*Alkaloids, Skeletal muscle relaxants), Drugs, Biological assay, Neuromuscular transmission, Contraction, Relaxation (Physiology), Body fluids, pH, Adenosine phosphates, Electrolytes (Physiology), Muscles, Mammals.

Efforts to isolate, from granule suspensions incubated with MG(++) and ATP, a chemical substance capable of relaxing contracted muscle fibers were unsuccessful. Conditions were established under which ryanodine increased by a factor of two or more the time required for fiber bundles to relax after addition of calcium to the bath containing ATP, MG(++) and granules.

AD-600 299 Div. 16
OTS Price $4.60

Baylor Univ., Houston, Tex. Coll. of Medicine.
THE EFFECT OF TOTAL BODY IRRADIATION ON IMMUNOLOGIC TOLERANCE OF BONE MARROW AND HOMOGRAFTS OF OTHER LIVING TISSUE.
Final rept., 1 Feb 63-31 Jan 64
by Vincent P. Collins. 31 Jan 64, 48p
Contract DA49 146xz032

Unclassified report

Report on Nuclear Weapons Effects Research no. 03.011.

Descriptors: (*Whole body irradiation, Bone marrow), (*Bone marrow, Radiotherapy), (*Radioprotective agents), Radiation tolerance, Radiation sickness, Dose rate, Radiological dosage, Cancer, Leukocytes, Biological products, Tissues (Biology), Transplantation, Immunology, Radiobiology.

The effects of total body irradiation on 112 adults with disseminated cancer are summarized. This data has been collected over a ten year period. Tables are presented showing the dose rate, the time intervals between irradiation, and the survival time of the patients. The reaction of white blood cells and granulocytes following varying radiological doses and the effect of bone marrow injections following irradiation are described with case histories, charts, and graphs. An annotated bibliography containing 78 reports selected from a review of more than 600 reports lists the organism used in the study, the amount of radiation used, and the findings for each of these reports. This literature search covers the period from 1967 through 1962.

AD-600 323 Div. 16
OTS Price $0.75

Naval Radiological Defense Lab., San Francisco, Calif.
STUDIES ON THE FORMATION OF HEPATIC LYMPH.
by J. S. Krebs, R. W. Brauer, J. L. Bollman, and G. F. Leong.
10 Mar 64, 22p
Task MR005 08 1200
NRDL TR732

Unclassified report

Descriptors: (*Lymph, Liver), (*Liver, Lymph), Secretion, Bile, Biliary system, Liver function tests, Biological stains, Blood plasma, Blood chemistry, Blood circulation, Cells (Biology), Chromatographic analysis.

Samples of hepatic lymph collected from isolated perfused rat livers or from livers of whole rats, during continuous infusion of sulfobromophthalein sodium (BSP), showed two types of response with respect to content of BSP. One of these was characterized by lymph BSP concentrations below those in blood plasma, and a chromatographic composition of lymph BSP different from that in both plasma and bile. In the other response, the BSP concentrations in lymph were grossly higher than those in plasma, and the chromatographic composition of the BSP was identical with that in bile. The second response was observed whenever bile flow was deliberately arrested, but it also occurred when bile was apparently flowing freely, suggesting that a type of nonobstructive, non-hemolytic jaundice could exist, based upon failure of labile mechanisms which normally prevent diffusion of biliary substances into the extracellular space. The chromatographic composition of the BSP in responses of the first type suggests that part of the BSP in hepatic lymph normally arises from the hepatic cells, rather than either the blood plasma or the bile. (Author)

AD-600 333 Div. 16
OTS Price $0.75

Biotechnology Lab., Univ. of California, Los Angeles.
UPPER EXTREMITY PROSTHETICS RESEARCH. HUMAN TRACKING, SENSORY MOTOR CONTROL, MYOELECTRIC CONTROL STUDIES.
Progress rept.
15 Dec 63, 30p UCLA DE63 68
Contracts V1005M2075; N123 60530 23558A

Unclassified report

Descriptors: (*Prosthetics, Control systems), (*Muscles, Motor reactions), (*Tracking, Operators (Personnel)), Arms, Simulation, Biophysics, Electric currents, Specifications.

Contents: upper extremity prosthetics research, fundamental studies to establish body control sites for application to externally-powered prostheses, control engineering survey, analysis of existing externally-powered prostheses and development of advanced design specifications, needs analyses for selected functional units of the upper extremity prosthetics armamentariam; research on sensory-motor control; myoelectric control studies, research on the performance of human operators of tracking systems, performance evaluation of variables of the optical system on the NOTS tracking simulator, multiman tracking studies.

AD-600 342 Div. 16
OTS Price $1.10

Free Univ., Berlin (West Germany).
RESEARCH ON VOLUME CONDITIONED STIMULI AFFECTING SALT AND WATER EXCRETION.
Report no. 2 (Final), 1 Oct 62-31 Jan 64
by Otto H. Gauer. 15 Mar 64, 4p
Grant AF EOAR62 75
AFOSR 64 0992

Unclassified report

Descriptors: (*Stimulation, Excretion), (*Volume, Body fluids), (*Body fluids, Volume), Conditioned reflex, Salts, Urine, Parenteral infusion, Blood plasma, Blood pressure, Osmosis, Osmotic pressure, Heart, Arteries, Kidney function tests.

Humoral effects and changes of renal hemodynamics during left atrial distension, competition of osmotic and volume conditioned stimuli in trained animals and the effect of body water immersion on plasma volume and a diuretic factor in the plasma were investigated. Results are given. (Author)

AD-600 343 Div. 16, 25
OTS Price $4.60

Uppsala Univ. (Sweden).
RESEARCH ON THE GENESIS OF ACTION POTENTIAL IN EXCITABLE TISSUES.
Technical (final) rept.
by Torsten Teorell. 13 Apr 64, 44p
Grant AF EOAR63 5
AFOSR 64 0988

Unclassified report

Descriptors: (*Radioprotective agents, Biological assay), (*Biological assay, Radioprotective agents), Drugs, Monkeys, Genetics, Anomalies, Toxicity, Radiation sickness, Radiation effects, Inhibition, Ionization, Thiols.

Mercaptoethylamine and three coded compounds which have been shown to be protective against ionizing radiation were studied with respect to the evaluation of their safety when administered to rhesus monkeys. Various parameters such as body weight gain, hemograms, blood and urine analyses and histopathological observations were employed. A teratogenic evaluation of mercaptoethylamine in rats and a blood picture study in splenectonized rabbits which is now being carried out are described.

AD-600 257 Div. 16
OTS Price $0.50

Milan Univ. (Italy).
THE MECHANISM OF ACTION OF ADJUVANTS.
Final rept., 1 Mar 63-29 Feb 64
by A. Giovanardi and B. Pernis. 29 Feb 64 13p
Contract DA91 591EUC2841

Unclassified report

Includes Quarterly technical status report number 4, 1 Dec 63-29 Feb 64.

Descriptors: (*Immunity, Antigen-antibody reactions), (*Antigen-antibody reactions, Immunity), Antigens and antibodies, Immunology, Stimulation, Toxins and antitoxins, Blood cells, Cell division, Leukocytes, Biological products, Mitosis.

The adjuvant effect of endotoxins in rabbits and mice was studied to clarify the mechanism of the action of adjuvants. The adjuvant action of endotoxin on antibody formation was found to be the result of a rapid and direct effect on the immunologically competent cells which causes an increase in the number of young blast cells. These either secrete antibodies themselves or mature into antibody secreting plasma cells, particularly at the level of the germinal centers. This is due to the stimulation of the mitotic activity of these blast cells. The adjuvant effect of endotoxins was evident in the early stages of antibody response. Later, if sufficient antigen is not available or repeatedly administered, the effects of the initial dose of endotoxin becomes less obvious.

AD-600 259 Div. 16
OTS Price $0.50

New York State Univ., Buffalo.
NEUROLOGIC ASPECTS OF HIGH BAROMETRIC PRESSURE PHENOMENA AND THE EFFECT OF ATMOSPHERIC CONTAMINANTS UPON NERVOUS SYSTEM ACTIVITY.
Final technical rept., 1 Nov 59-31 Dec 63
by H. William Gillen. 31 Dec 63, 5p
Contract Nonr969 040, Proj. NR102 489

Unclassified report

Descriptors: (*Nervous system, Barometric pressure), *Oxygen consumption, Respiration, Electrocardiography, Electroencephalography, Hypoxia, Blood chemistry, Brain, Convulsive disorders, Cardiovascular diseases, Germinal tissue, Tissues (Biology), Rats, Rabbits, Electrolytes (Physiology).

Electroencephalograms (EEG), electrocardiograms (EKG), and respiratory rates were recorded for rats and mice exposed to mixtures of 35% carbondioxide and 65% oxygen. The venous blood, cerebral cortex, cardiac muscle, liver, and skeletal muscle tissues were analyzed for sodium, potassium, chloride, water, carbon dioxide, phosphorus, calcium, magnesium, glucose, hydrogen ion concentration, and adenosinetriphosphate. The EEG initially became slow, followed by hyperexcitability with isolated discharges of combined fast and slow activity resembling the complex of petit mal epilepsy. If convulsions occurred, the electrical activity was symmetrical and bilaterally synchronous. Following seizure, the plasma and cerebral cortex electrolytes shifted in the direction of theoretical hyperexcitable depolarization. Repeated exposures to the carbon dioxide mixtures caused less frequent seizures, often accompanied by cardiac excitement resembling ventricular fibrillation. Unanesthetized, unrestrained rats were used to study susceptability to oxygen poisoning as manifested by convulsions at different pressures. When the exposures were continued beyond the earliest convulsions, the animals developed ventilatory distress and died. The EEG patterns were of the classical seizure type. Exposure to increased pressure and oxygen content caused little change in the EKG. Autopsies revealed no alterations in the brain after oxygen exposure. Spermatogenesis was arrested, but no changes were found in other organs.

AD-600 260 Div. 16
OTS Price $0.50

Jewish Hospital, St. Louis, Mo.
THERAPEUTIC PROPERTIES OF BLOOD PLASMA IN THE THERAPY OF TOURNIQUET SHOCK.
Progress rept. 1 Jan 63-30 Apr 64.
by Morton D. Pareira. 30 Apr 64, 19p
Contract DA49 007MD799

Unclassified report

Descriptors: (*Blood plasma, Shock (Pathology)), (*Shock (Pathology), Blood plasma), Therapy, Blood transfusions, Electrolytes (Physiology), Blood proteins, Blood chemistry, Aging (Physiology), Albumins, Plasma substitutes, Rats.

A significant difference in therapeutic effectiveness was demonstrated in the treatment of rat tourniquet trauma between reconstituted lyophilized aged human plasma (RLAP) and other clinically used albumin containing protein electrolyte solutions (Albumisol, Plasmanate, Agamma Human Serum). RLAP in this experimental system provides a much superior survival rate even though the degree of plasma volume expansion provided by the two types of solutions is the same as long as 4 hours after tourniquet release. Because recently collected human plasma allows no survival after this trauma when given in the same way, it is believed that something deleterious is removed from the fresh plasma or something beneficial is produced in it during aging. The bulk of evidence to this point supports the latter hypothesis. Five Cohn fractions (I, II, IV-1, IV-4, V) have been suspended in a sodium chloride, sodium bicarbonate solution and produced the same survival results achieved by the control plasma (RLAP). Fraction III in the mixture is not required. (Author)

AD-600 263 Div. 16, 25
OTS Price $0.50

Pennsylvania Univ., Philadelphia.
NON-THERMAL EFECTS OF ALTERNATING ELECTRICAL FIELDS ON BIOLOGICAL STRUCTURES.
Final rept. 1 Jan 63-29 Feb 64
by Herman P. Schwan. 30 Apr 64, 13p
Contract Nonr551 05

Unclassified report

Descriptors: (*Radiation effects, Electromagnetic waves), (*Electric fields, Radiation Tolerances), Biophysics, Tissues (Biology), Electrotherapy, Tolerances (Physiology), Thermal radiation, Particles, Dielectric properties, Electrophoresis, Skin, Thresholds (Physiology).

Four possible non-thermal effects of alternating electrical fields were experimentally and theoretically studied. These four effects were assessed for their possible biological significance. These effects, all the result of mechanical forces on particles dispersed in a fluid, are (1) pearl-chain formation, (2) orientation of nonspherical particles, (3) forces in inhomogeneous electrical fields, and (4) alternating electrophoresis. Summaries of research on each of these effects are presented.

Descriptors: (*Space environmental conditions, Klebsiella pneumoniae), (*Klebsiella pneumoniae, Space environmental conditions), Mice, Infectious diseases, Respiratory diseases, Body weight, Food.

This study shows the effect of exposure of mice to an altitude of 35,000 feet and to an atmosphere consisting of approximately 85% oxygen, 10% carbon dioxide, and 5% nitrogen for 3, 7, 14, and 30 days on susceptibility to respiratory infection caused by aerosols of Klebsiella pneumoniae. Mice exposed to 35,000 feet for 14 days prior to challenge and then returned to 35,000 feet exhibited an increase in mortality from 37% to 76%. 'Mice exposed to 35,000 feet for 14 days prior to challenge and then kept at ambient altitude exhibited an increase in mortality from 37% to 53%.'There was an increased neutrophilic percentage accompanied with a lower white cell count in the blood of mice exposed to 35,000 feet for 14 days. Mice lost weight initially when placed at 35,000 feet. They started gaining weight after about 2 weeks, and the rate of weight gain was approximately that of mice kept at ambient altitude. Mice kept at 35,000 feet consumed more food than mice kept at ambient altitude. (Author)

AD-600 424 Div. 16
OTS Price $0.50

Pennsylvania Univ., Philadelphia. Graduate School of Medicine.
VENTILATION OF PARTS OF THE LUNG WITH CHEMICALS AND GASES IN AQUEOUS SOLUTION.
Progress rept., 1 Dec 63-31 May 64
by R. Wetton and A. B. DuBoise. 31 May 64, 10p
Contract DA18 108AMC143A
Unclassified report

Descriptors: (*Bronchi, Absorption (Biological), (*Absorption (Biological), Bronchi), (*Aerosols), Antibiotics, Drugs, Lungs, Solutions, Water, Gases, Fluids.

The feasability of washing a lobe of the lungs with aqueous solutions of biological or chemical substances was demonstrated. The ability to obtain a high concentration of antibiotic for a long period was proven. Mixing and sampling problems were evaluated and found to constitute no obstacle. Adverse effects on the dog were not encountered.

AD-600 435 Div. 16, 25, 30
OTS Price $1.50

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
SPEECH ANALYSIS AND SYNTHESIS.
Final rept.
Dec 63, 51p
Contract AF19 604 6102, Proj. 4610, Task 461002
AFCRL 64 300
Unclassified report

Descriptors: (*Speech, Analysis), (*Speech, Models (Simulations)), (*Models (Simulations), Speech), Speech transmission, Speech recognition, Acoustics, Auditory perception, Noise, Sound signals, Synthesis, Resonance, Voice communication systems, Spectrum analyzers, Programming (Computers), Computers.

This report summarizes research on speech analysis and synthesis during the period October 1, 1959 to September 30, 1963. The introduction of the report gives a general outline of the problems that were studies and indicates that the emphasis was on the search for the generative rules governing the production of speech. The work on speech synthesis included the modification and improvement of an existing electrical analog of the vocal tract and the design of a new synthesizer with improved capabilities. Experiments on the generation of several classes of speech sounds were carried out with the existing synthesizers. Techniques of reduction of speech spectra were developed, based on an analysis-by-synthesis approach. The properties of limited classes of natural speech events were studied both through acoustic analysis of the spectra and through direct examination of the articulatory processes. In the latter case both high-speed photography and cineradiographic techniques have been exploited. In addition, experimental investigations relating to the perception of speech and speech-like sounds have been carried out. (Author)

AD-600 446 Div. 16
OTS Price $0.75

South Pacific Commission, Noumea (New Caledonia).
FISH INTOXICATION. NOTES ON CIGUATERA, ITS MODE OF ACTION AND A SUGGESTED THERAPY.
by A. H. Banner, S. W. Shaw, C. B. Alender and Philip Helfrich. Sep 63, 26p SPC TP141
Contracts AT04 3 235, Nonr2289 00, Proj. NR107 405
Unclassified report

Descriptors: (*Fishes, Toxicity), *Food poisoning, Toxins and antitoxins, Identification, Curare alkaloids, Pharmacology, Marine biology.

Certain characteristics of the toxin causing ciguatera are reviewed, and it has been pointed out that there is no method of recognizing specific fish which may bear the toxin, nor of detecting the toxin in a fish except by feeding tests, nor of destroying the toxin by any normal means of food preparation. Some aspects of the pharmacology of the toxin and a possible similarity in action of the toxin to the curariform drugs are discussed. Case histories are presented in which recovery, partial or complete, might be attributed to neostigmine or neostigmine-Tensilon therapy. Chemical and pharmacological studies are reviewed which show similarities between the toxin found in a barracuda from Guam and red snappers from the Line Islands. (Author)

AD-600 467 Div. 16
OTS Price $0.75

Sawyer (A. J.) Co., Inc., Strykersville, N. Y.
CIRCULATING DEVICE FOR CLOSED CIRCUIT RESPIRATORY SYSTEM.
Technical documentary rept., Apr 62-Nov 63.
by Charles C. Jennings. Feb 64, 23p
Contract AF33 657 9019, Proj. 6373, Task 637302
AMRL TDR64 8
Unclassified report

Descriptors: (*Breathing apparatus, Closed ecological systems), (*Closed ecological systems, Breathing apparatus), Space medicine, Space environmental conditions, Respiration, Oxygen equipment, Batteries and components, Centrifugal compressors, Variable resistors, Impellers, Direct current, Voltage, Blowers.

One type of circulating device for use in a closed circuit respiratory system is described. Circulation is required in a closed system to remove carbon dioxide, add oxygen, remove moisture, and cool recirculating gases. The device is a single-stage, centrifugal-type blower capable of discharging 12 CFM of oxygen against a back pressure of 25 inches of water. It is powered by a 28-volt D. C. motor. Power supply is a silver cell battery. Flow control is maintained electrically by a rheostat. (Author)

AD-600 474 Div. 16, 15
OTS Price $5.60

Institute for Research, State College, Pa.
MICROSTRUCTURE OF GUESS PROCESSES: PART C.
Rept. no. 3,
by Masanao Toda. Sep 63, 51p
Contract AF19 628 2968, Proj. 4690
ESD TDR63 548
Unclassified report

Descriptors: (*Decision making, Probability), (*Probability, Decision making), Learning, Models (Simulations), Stochastic processes, Mathematical analysis, Sequences, Mathematical prediction.

Descriptors: (*Membranes, Stimulation), (*Stimulation, Membranes), Tissues (Biology), Cells (Biology), Biophysics Physiology, Electric currents, Oscillators, Ionization potentials, Ion exchange, Models (Simulations), Electrolytes (Physiology).

This report summarizes the research on the following: (1) Stable and unstable convection phenomena in a fixed charge membrane barrier, (2) Ion fluxes in the membrane oscillator, (3) The electrohydraulic excitability analog applied to presso-receptor problems, (4) Research on ion selectivity in an artificial system.

AD-600 380 Div. 16
OTS Price $1.10

Karolinska Inst., Stockholm (Sweden).
SYMPATHETIC VASODILATOR OUTFLOW.
Final technical rept.
by Borje Uvnas. 28 Aug 62, 7p
Grant AF EOAR63 15
AFOSR64 0985

Unclassified report

Descriptors: (*Blood circulation, Autonomic nervous system) (*Autonomic nervous system, Blood circulation) (*Thalamus, Stimulation) Muscles, Legs, Nerve cells, Behavior, Adaptation (Physiology) Electrodes, Dogs.

Electrodes were implanted into the hypothalamus of dogs. Blood flow was measured in the femoral artery with an electromagnetic flow recorder. The circulation of the paw was cut off with a pneumatic cuff to ensure as pure muscle blood flow as possible. The electrodes were cemented into place when the sympathetic vasodilator area was reached as evident from the stimulatory response. Electrical activation of the sympathetic vasodilator area was repeated on the unanesthetized dogs. The circulatory responses and the behavior reactions were simultaneously recorded. As a final step, the animal was again anesthetized and the sympathetic vasodilator system activated to ensure that the electrodes were still in place. The dogs were then sacrificed and the hypothalamus removed for histological examination. (Author)

AD-600 381 Div. 16,
OTS Price $1.60

Cambridge Univ. (England).
THE EFFECT OF OVARIAN HORMONES ON THE ACTIVITY OF HYPOTHALAMIC NEURONES.
Final technical rept.
by B. A. Cross and I. A. Silver. 24 Apr 64, 14p
Grant AF EOAR62 47
AFOSR 64 0986

Unclassified report

Descriptors: (*Ovaries, Nerve cells), (*Estrogens, Thalamus), (*Thalamus, Estrogens), Sex hormones, Progesterone, Inhibition Stimulation, Pain, Temperature, Electroencephalography, Rats.

Unit activity in the diencephalon of adult female rats under light urethane anaesthesia was recorded with steel micro-electrodes and a polygraphic recording system. The responsiveness of neurones to pain and cold stimuli on the tail and mechanical probing of the cervix was examined. In dioestrous rats, injection of one or ten micrograms of oestradiol intramuscularly increased the incidence of inhibitory effects of the standard stimuli in hypothalamic neurones while one microgram of oestradiol produced no change. In a group of pseudopregnant rats, hypothalamic neurones showed a markedly depressed responsiveness to cervical probing similar to that previously observed in cyclic rats following injected progesterone. No corresponding hormonally induced changes in responsiveness were observed in thalamic neurones. (Author)

AD-600 402 Div. 16
OTS Price $1.60

School of Aerospace Medicine, Brooks AFB, Tex.
PHOTOSTRESS AND FLASH BLINDNESS IN AEROSPACE OPERATIONS.
by Sanford L. Severin, Albert V. Alder, Norris L. Newton, and James F. Culver. Sep 63, 15p
Task 775101
SAM TDR63 67 PB 165 893

Unclassified report

Descriptors: (*Flashblindness, Space medicine), Stress (Physiology), Vision, Performance (Human), Drugs, Hazards.

The hazard of flash blindness to the success of an aerospace mission is well recognized. Until recently, there has been a paucity of information on the effects of short-duration, high-intensity light flashes on visual performance. The paper presents the results of several experiments designed to study the severity of the visual disturbance from this type of photo-stress. In these expanded and more comprehensive studies subjects have been exposed to bright flashes that illuminate the cornea with intensities up to 242,000 lux (about twice the illumination that an unprotected astronaut would be exposed to on an earth orbit). An analysis was made of the effect of drug-induced miosis upon the time required for recovery. The relevance of the information derived from this work to problems of space and nuclear operations is mentioned, and the operational significance is implied. (Author)

AD-600 406 Div. 16
OTS Price $0.75

Medical Coll. of Virginia, Richmond.
ADULT ACQUIRED TOLERANCE TO SKIN AND KIDNEY HOMOGRAFTS.
Final technical rept., 1 Oct 63-1 Jul 64
by Richard H. Egdahl. 1 Jul 64, 29p
Contract DA49 193MD2505

Unclassified report

Descriptors: (*Tolerances (Physiology), Antigen-antibody reactions), (*Antigen-antibody reactions, Tolerances (Physiology), *Transplantation, Skin, Kidneys, Tissues (Biology), Spleen, Cells (Biology), Tissue cultures, Tissue extracts, Immunity, Ribonucleic acids.

Pooled rabbit kidneys were extracted to yield an opalescent highly-proteinaceous material. This antigenic preparation was injected five days a week either intravenously or intraperitoneally into normal rabbits. After four weeks of this regimen, the animals were skin grafted from normal donors. Survival times of the graft were observed to be neither accelerated or retarded compared to a control series. The only consistent hematologic finding was an increased platelet count shortly after starting the injections. The second part of these experiments was directed towards growing dog spleen cells in tissue culture, and retrieving transplantation antigens from the media. The media in which cultured spleen cells grew did contain material which when injected into dogs immunized them against future kidney homografts from the donor of the cultured spleen cells. An attempt to show that RNA administration resulted in prolongation of skin homograft survival in rabbits failed to demonstrate an effect of RNA on skin homograft survival when the donor RNA was infused into recipient rabbits.

AD-600 408 Div. 16
OTS Price $0.50

IIT Research Inst., Chicago, Ill.
EFFECTS OF SPACE CABIN ENVIRONMENTS ON RESISTANCE OF MICE TO INFECTION WITH KLEBSIELLA PNEUMONIAE.
by Bernard J. Mieszkuc and Richard Ehrlich.Mar 64,13p
Contract AF41 657 351,Proj. 7930Task 793002
SAM TDR649

Unclassified report

AD-600 532 Div. 16
OTS Price $0.50

Medical Coll. of Georgia, Augusta
THE ABSORPTION OF LONG-CHAIN FATTY ACIDS BY INTESTINAL PERFUSION IN SITU.
Annual progress rept., 5 Apr 63-29 May 64.
by James C. McPherson. 29 May 64, 6p
Contract DA49 193MD2499

Unclassified report

Report on Studies of Lipid Metabolism Using C-14 Labeled Materials

Descriptors: (*Absorption (Biological), Intestines), (*Intestines, Absorption (Biological), (*Metabolism, Lipids), (*Lipids, Metabolism) Tracer studies, Physiology, Carbohydrates, Fatty acids, Digestive system.

The intestinal absorption of lipids has been demonstrated by several techniques, each of which has its own advantages and disadvantages. Some of the disadvantages can be overcome by employing the method of in situ perfusion of an isolated intestinal segment for carbohydrate absorption. With this technique, the absorption of long-chain fatty acids, as bile salt micelles, has been demonstrated. The pattern of absorption is similar to the pattern for the transporting of glucose and suggests an active transport mechanism for fatty acids. (Author)

AD-600 533 Div. 16
OTS Price $0.50

Medical Coll. of Georgia, Augusta
FURTHER STUDIES ON THE EFFECT OF LIPASE INGESTION ON BLOOD LIPID LEVELS.
Annual progress rept., 5 Apr 63-28 May 64.
by James C. McPherson. 28 May 64, 6p
Contract DA49 193MD2499

Unclassified report

Report on Studies of Lipid Metabolism Using C-14 Labeled Materials

Descriptors: (*Absorption (Biological), Lipids), (*Lipids, Absorption (Biological)), (*Tolerance (Physiology), Lipids), Metabolism, Digestive system, Tracer studies, Physiology, Pancreas, Enzymes, Blood chemistry.

The effect of the ingestion of a high potency pancreatic lipase preparation to lower the fat tolerance curve in dogs and men, appears to be mediated through an increase in lipolytic activity of the blood. Studies utilizing rats fed a C14-labeled triglyceride meal suggest an alternate mechanism. With pancreatic lipase supplementation, the rate of absorption of lipid is increased about 30% in the early phase of absorption then decreased at a later time. In a six hour post-feeding experiment, the overall rate of absorption was decreased by about 30% as measured by comparing the areas under curves of blood radioactivity and also by C1402 expiration. The possible explaination for these results are discussed. (Author)

AD-600 548 Div. 16
OTS Price $0.50

Arctic Aeromedical Lab., Fort Wainwright, Alaska.
PARARESCUE MEDICAL KIT.
by W. W. Millard and J. R. Schumann. Jan 64, 10p
Proj. 8238, Task 823801
AAL TDR64 1

Unclassified report

Descriptors: (*Rescue kits, Medical supplies), (*Medical supplies, Rescue kits), Arctic regions, Air-sea rescues, Medical equipment, Survival kits, Flares, Protective clothing, Snowshoes, Packs (Parachute).

At the request of the Alaskan Air Command a medical kit for the use of their pararescue team was developed. The kit consists of a canvas container with two large compartments, one equipped with medical supplies and the other with survival items such as down-filled coat, flares, etc. Two side pockets are available to carry the URC-4 radio transceiver and battery. The kit is designed to allow the strapping on of bearpaw snowshoes for use in winter operations. Total weight of the kit is 29 pounds; with snowshoes, 35 pounds. The kit was jump tested and is now in operational use by the Alaskan Air Command pararescue team. (Author)

AD-600 549 Div. 16
OTS Price $0.75

Duke Univ., Durham, N. C. School of Medicine.
VASCULAR RESPONSES DURING HYPOTHERMIA.
by W. C. Sealy, M. A. Lesage and W. G. Young, Jr.
Oct 63, 30p
Contract AF41 609 1999, Proj. 8237, Task 823703
AAL TDR63 19

Unclassified report

Descriptors: (*Hypothermia, Blood circulation), (*Blood circulation, Hypothermia), Muscles, Blood pressure, Stimulation, Reflexes, Body temperature, Acetylcholine, Epinephrine, Drugs.

In a series of experiments on dogs, it was found that core-induced hypothermia of 10 C does cause a decrease in vascular tone. The blood vessels maintain their ability to respond to epinephrine, norepinephrine, acetylcholine, and reflex changes as mediated through the carotid sinus. The response to vagal stimulation was blocked at a somewhat higher temperature than was the response to sympathetic stimulation. The dogs still responded to acetylcholine. Due to causes as yet undetermined, muscle blood flow was greatly diminished during core-induced hypothermia. This diminution or shift perhaps augments the flow in the central circuit and may be a protective mechanism. Quinidine does not abolish the temperature gradients in muscle. It did reduce the reactivity of the vascular tree, and perhaps in this manner is helpful in maintaining an adequate perfusion of the vital central areas. Abolition of all vascular control, in spite of the attractiveness of the theory of uniform perfusion, may not be advantageous. (Author)

AD-600 550 Div. 16
OTS Price $1.25

Wisconsin Univ., Madison.
EFFECTS OF VARIATIONS IN CARBOHYDRATE, PROTEIN AND FAT INTAKE ON CHARACTERISTICS OF GROWTH OF RATS.
by Dorothy J. Pringle and Marjorie M. Lavers. Dec 63, 44p
Contract AF41 657 30, Proj. 8238, Task 823803
AAL TDR63 8

Unclassified report

Descriptors: (*Diet, Obesity), (*Rats, Growth), (*Obesity, Diet), Nutrition, Body weight, Proteins, Fats, Food, Carbohydrates.

Rats of the Sprague Dawley and Osborne Mendel strains were fed purified rations containing 4.5% and 60% fat for periods ranging from 25 to 40 weeks. For both strains there was a significantly greater average weight gain with the higher fat intake than with the lower fat intake. The Osborne Mendel rats gained more weight than the other strain and it was found that at least 50 per cent of the Osborne Mendel group on the high fat diet were obese after 25 weeks. There was no significant difference between the caloric intakes of the two groups for either experiment. Studies of the output of C14O2 and C14 incorporation into tissue lipids following injection of acetate-1-C14 failed to differentiate the two groups in either study. Body composition values for the Osborne Mendel rats showed an increased deposition of fat and a diminished amount of protein and moisture in the rats fed the high fat diet as compared with those fed the high carbohydrate diet. An extensive review of the literature is included. (Author)

Trial-to-trial changes in the proportion of human subjects predicting the occurrence of one of two events in a complex sequence of binary events (probability learning) are analyzed in terms of several simple models. The direction of change predicted by linear-operator reinforcement models (Estes, Bush and Mosteller) is wrong on about 75% of the trials. A no-learning model, a time-dependent decay model, and a cycle-dependent decay model are used to provide some insight into the nature of probability learning. Some suboptimal procedures for estimating parameters of stochastic processes are compared. The method of minimum absolute error is recommended as being very useful. (Author)

AD-600 481 Div. 16, 32
OTS Price $10.10

Iowa State Univ., Iowa City.
MEASURING THE UTILIZATION OF A FEDERAL SHORT TERM GENERAL HOSPITAL.
Master's thesis,
by Francis Montague. Jun 64, 122p.
Unclassified report

Descriptors: (*Hospitals, Military personnel), Population, Aging (Physiology), Sex, Education, Sampling.

It is shown that there is no significant difference in admission rate experienced by individuals of different income levels among a selected group of persons served by a Federal military medical facility. It has also been demonstrated that the data upon which this evidence is based was drawn from a homogeneous sample group and that an efficient random sampling technique was employed in obtaining this data. The effects of such factors as the level of education of the head of the family unit and accessibility of the medical facility do not diminish the acceptability of the null hypothesis. (Author)

AD-600 484 Div. 16
OTS Price $0.50

Foreign Tech. Div. Air Force Systems Command, Wright-Patterson AFB, Ohio.
SYMPOSIA ON ELEUTHEROCOCCUS AND GINSENG.
by M. A. Grinevich, N. I. Uvarova, and A. M. Yudin.
26 Mar 64, 9p
FTD TT64 91, TT 64 11726
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Sibirskoe Otdelenie. Izvestiya, 1963 (no. 8) Seriya Biologo-Meditsinskikh Nauk, no. 2, p. 139-141.

Descriptors: (*Plants (Botany), Symposia), (*Plants (Botany), Drugs), Pharmacology, Cancer, Glycosides.

A brief report of a symposia on the Far Eastern medicinal plants, Eleutherococcus and Ginseng, which lists the author and title of the reports presented.

AD-600 490 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PROTECTIVE AND THERAPEUTIC EFFECT OF THE SOMATOTROPIC HORMONE IN ACUTE RADIATION SICKNESS.
by S. A. Davydova. 13 Apr 64, 6p
FTD TT64 122, TT 64-11728
Unclassified report

Unedited rough draft trans. of Patologicheskaya Fiziologiya i Eksperimental'naya Terapiya (USSR) 1963, v. 7, no. 4, p. 64-65.

Descriptors: (*Radioprotective agents, Pituitary hormones), (*Pituitary hormones, Radioprotective agents), Drugs, Growth substances, Inhibition, Radiation sickness.

AD-600 494 Div. 16
OTS Price $1.60

Bunker-Ramo Corp., Canoga Park, Calif.
LINGUISTIC AND ENGINEERING ASPECTS OF AUTOMATIC SPEECH RECOGNITION.
Technical note no. 8
by Paul L. Garvin and Sidney Bertram. 15 Feb 64, 5p
Contract AF49 638 1128,
Unclassified report

Rept. on Inductive Methods in Language Analysis

Descriptors: (*Speech recognition, Sound signals), (*Sound signals, Speech recognition), Language, Speech representation, Pattern recognition, Acoustic properties, Sound reproduction systems, Hearing, Sound pitch.

Automatic speech recognition is viewed in terms of three sets of factors: the acoustic environment, the context of the sounds to be recognized, and the sounds themselves. The particular problems presented by each of these factors is surveyed briefly.

AD-600 495 Div. 16
OTS Price $1.60

Bunker-Ramo Corp., Canoga Park, Calif.
LINGUISTICS, BRAIN RESEARCH AND SPEECH PATHOLOGY.
Technical note no. 9
by Paul L. Garvin. 15 Apr 64, 12p
Contract AF49 638 1128,
Unclassified report

Rept. on Inductive Methods in Language Analysis

Descriptors: (*Language, Scientific research), *Speech, Language, Pathology, Reliability, Brain.

AD-600 503 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A CONSULTATION WITH THE URAL 2.
by T. Akkuratova. 26 Mar 64, 6p
FTD TT64 175, TT 64-11723
Unclassified report

Unedited rough draft trans. from Trud [Moscow] (USSR) 1963, 24 Mar, p. 4.

Descriptors: (*Diagnosis, Computers), (*Cybernetics, Diagnosis), Medicine, Punched cards, USSR.

AD-600 512 Div. 16
OTS Price $0.75

Johns Hopkins Univ., Baltimore, Md. School of Medicine.
A COMPREHENSIVE STUDY OF VIRAL HEPATITIS.
Annual progress rept., 15 Jul 63-14 Jul 64
by Ivan L. Bennett, Jr. 29 May 64, 24p
Contract DA49 193MD2310
Unclassified report

Descriptors: (*Infectious hepatitis, Etiology), Histological techniques, Diagnostic agents, Tissue cultures, Infants, Virus diseases, Adenoviruses, Oxidoreductases, Phosphoric monoester hydrolases.

This report includes summaries of the following research: (1) A study of agents associated with viral hepatitis in man. (2) Human cytomegalovirus infection in tissue culture. (3) A histochemical study of oxidative enzymes and phosphatases in experimental murine hepatitis. (4) Biopsy studies of patients with infectious hepatitis and neonatal hepatitis.

AD-600 580 Div. 16, 8
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ELECTRONIC DEVICE FOR SIMULATING THE ELECTRICAL ACTIVITY OF THE HEART.
by I. T. Akulinichev, E. B. Babskii, G. G. Gel'shtein, G. M. Petrov, and A. I. Skachkova. 25 Mar 64, 19p
FTD TT63 1198; TT 64 11686

Unclassified report

Unedited rough draft trans. of memo. Elektronika v Meditsine [Electronics in Medicine] Moscow/Leningrad, 1960, p. 312-326.

Descriptors: (*Bionics, Heart), (*Heart, Bionics), (*Electrocardiography, Cybernetics), Computers, USSR, Simulation.

Simulation of the electrical activity of the heart was used for studying the causes of various types of electrocardiograms. Electronic devices which simulate the electrical activity of the heart can be used as a visual training aid in the study of electrocardiography.

AD-600 581 Div. 16, 8
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ELECTRONICS AND INDUSTRIAL SAFETY.
by P. M. Konin, V. A. Franke, A. A. Butilev, P. A. Kouzov, and I. M. Vitrinskii. 25 Mar 64, 13p
FTD TT63-1200; TT 64-11687

Unclassified report

Unedited rough draft trans. of mono. Elektronika v Meditsine [Electronics in Medicine] Moscoe/Leningrad, 1960, p. 383-392.

Descriptors: (*Safety devices, Industrial plants), (*Safety, Electronic equipment), (*Measuring devices (Electrical and Electronic), Safety devices), Radioactive isotopes, Electronic relays, Electromagnetic fields, High frequency, Ultrahigh frequency, Noise, Static electricity, Illumination, Atmosphere, Air pollution, Industrial medicine, Radiation measurement systems, USSR.

The following areas of electronics as applied to industrial safety are discussed: (1) measuring the intensity of electromagnetic fields of low, high, and ultrahigh frequencies; (2) making instruments which will assure safety while operating electrical equipment; (3) measuring static electricity potentials; (4) measuring noise level and analyzing its frequency; (5) measuring illumination; (6) computing the dust content in the air and analyzing dust dispersion; (7) analyzing the content of harmful admixtures in the air such as vapors and gases; and (8) measuring radioactive intensity and X-radiation.

AD-600 594 Div. 16
OTS Price $0.50

Duke Univ., Durham, N. C. School of Medicine.
STUDIES ON TOLERANCE TO PROLONGED DEEP HYPOTHERMIA.
by M. A. Lesage, W. G. Young, Jr., and W. C. Sealy.
Oct 63, 17p
Contract AF41 609 1999, Proj. 8237, Task 823703
AAL TDR63 20

Unclassified report

Descriptors: (*Hypothermia, Tolerances (Physiology)), (*Tolerances (Physiology), Hypothermia), (*Parenteral infusions, Blood circulation), (*Blood circulation, Mechanical organs), Dogs, Metabolism.

The advantages of hypothermia, below 10 C for two hours, induced and maintained by extracorporeal circulation of 200 minutes were compared to partial bypass of the same duration during normothermia. In the normothermic group 5 of 6 dogs lived. In the hypothermic group 6 of 15 dogs (40 per cent) survived when perfused to the high flow of 55 cc/kg/min. Eleven of 15 dogs (73 per cent) survived when the flow rate was reduced to 20 cc/kg/min when the temperature was below 10 C. Metabolic data showed that no severe acidosis was present postoperatively in any group, and especially in the low flow group. The mortality was due to postperfusion lung syndrome even when low pressure was maintained in the left auricular chamber during perfusion. These findings are discussed and justify the use of low flow hypothermia during long lasting perfusion. (Author)

AD-600 606 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE EFFECT OF IONIZING RADIATION OF HEPATIC REGENERATION IN WHITE MICE AFTER BRIEF AND CHRONIC IRRADIATION.
by G. S. Strelin and L. V. Shiffer. 7 Apr 64, 10p
FTD TT64 230, TT 64 11696

Unclassified report

Unedited rough draft trans. of Byulleten' Eksperimental'noi Biologii i Meditsiny (USSR) 1963, v. 56, no. 7, p. 87-91.

Descriptors: (*Liver, Radiation effects), (*Radiation effects Regeneration), (*Regeneration, Radiation effects), Radiation sickness, Ionization, Tissues (Biology), Dose rate, Radiological dosage, Radiobiology.

This work compares the reaction of the mammalian liver to irradiation with different dose rates where this concerns the level of physiological regeneration of that organ. Using regeneration of white mice livers after partial hepatectomy as a criterion, the level of hepatic injury during short- and long-term irradiation of the animals by Co 60 gamma rays was studied. Tests showed that when the dose rate is lowered and the irridation is extended over a month the radiation effect is lost. It is not clear whether this depends on reparation having time to compensate for radiation injury in the case of chronic, or if with a single exposure regeneration occurs concomitantly with radiation sickness. In chronic irradiation radiation sickness this was not expressed and could not influence the course of regeneration. This data supports the theory that local irradiation suppresses hepatic regeneration only with very large doses of radiation.

AD-600 610 Div. 16, 12
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A BRILLIANT NEW VICTORY OF SOVIET COSMONAUTICS: VALERI BYKOVSKI AND VALENTINA TERESHKOVA IN A NEW COSMIC TANDEM.
by Florin Zaganescu. 8 May 64, 13p
FTD TT64 34; TT 64 11700

Unclassified report

Unedited rough draft trans. of Stiinta si Tehnica (Rumania) 1963 v. 15 no. 7, p. 13-15.

Descriptors: (*Astronauts, Space flight), *Space medicine, *Space flight, Manned spacecraft, Safety, Space biology, Telemeter systems, Females, Males.

In this new space expedition, the main task assigned to the flight was the problem of studying the influence of the various factors of cosmic flight on the human organism, both as regards prolonged staying in orbit, and as to comparing the effects of these factors on the organisms of man and woman. In addition to these tasks, which require new, complex medical biological research work, the proving and improvement of the systems of manned space vehicles, especially under con-

Division 16 - MEDICAL SCIENCES

AD-600 551 Div. 16
OTS Price $1.00

Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
THE EFFECTS OF AMBIENT PRESSURE ON THE TOLERANCE OF MICE TO AIR BLAST.
Technical progress rept.
by Edward G. Damon, Donald R. Richmond, and Clayton S. White. Mar 64, 33p
Contract DA49 146XZ055
DASA 1483

Unclassified report

Presented before the Symposium on the Biological Effects of Blast and Shock. Headquarters Field Command Defense Atomic Support Agency, Sandia Base, Albuquerque, New Mexico, April 20, 1963.

Descriptors: (*Air burst, Tolerances (Physiology)), (*Tolerances (Physiology), Air burst), (*Pressure breathing, Air burst), (*Air burst, Pressure breathing), Mice, Shock tubes, Pressure, Adaptation (Physiology), Shock (Mechanics), Exposure.

Mice were exposed to overpressures of 'long' duration in the expansion chamber of an air-driven shock tube inside which the initial, pre-blast pressures were varied over sixfold. When the animals were held at the initial pressure for one hour following the blast before being returned to the ambient pressure of the laboratory, tolerance values, expressed as LD50-1-hour gauge pressures, increased fourfold; they were 20.3, 31.0, 44.5, 55.4, and 91.8 psi for initial pressures of 7, 12, 18, 24, and 42 psia, respectively. When animals were returned to ambient level soon after blast exposure, the LD50 pressures were lower than the above values for initial pressures greater than ambient and higher for initial pressures lower than ambient. The feasibility of scaling biological blast effects as a function of altitude is discussed and one approach suggested by available empirical data is regarded as a promising, but tentative procedure. (Author)

AD-600 554 Div. 16, 28
OTS Price $1.25

Coordinated Science Lab., Univ. of Illinois, Urbana.
HEART RATE CORRELATES OF INSIGHT.
Master's thesis.
by R. A. Avner. Apr 64, 42p CSL R198
Contract DA36 039AMC02208E and Grant NSF G23554, Proj. 3A99 25 004

Unclassified report

Descriptors: (*Heart, Pulse rate), (*Pulse rate, Heart), (*Emotions, Reasoning), (*Reasoning, Emotions), Cardiography, Pulses (Physiology), Reactions (Psychology), Psychophysiology, Respiration, Stimulation, Computers, Programming (Computers), Pattern recognition, Statistical analysis, Behavior, Adaptation (Physiology), Stress (Physiology).

The heart rate (HR) was found to be inadequate as an isolated intersubject correlate of mental work. It does not appear that reliable specific patterns will be found as long as respiration effects force use of procedures which cause uncertainity of HR-change identification. A possible answer to this problem would be a recording method by which respiration changes were used to adjust automatically for respiration effects in HR. Between the extremes of threat of physical punishment and what is essentially a vigilance task, there might be other situations in which insight leads to reliable HR patterns. Until effects of respiration on HR are eliminated, the possibility is small of finding reliable patterns more subtle than a large step function. (Author)

AD-600 556 Div. 16
OTS Price $2.25

Institute of Contemporary Russian Studies, Fordham Univ., New York.
A REVIEW OF SELECTED PROBLEMS OF TULAREMIA IN THE SOVIET UNION.
by Robert Pollitzer. Jan 64, 96p
Contract DA18 108 405CML867A

Unclassified report

Report on Part II/B; Applications for Vaccines and Vaccination.

Descriptors: (*Pasteurella, Diseases), Epidemiology, Disease vectors, Vaccines, Public health, Ticks, Rodents, Immunity, Biological contamination, Water supplies, Soils, USSR.

A survey of Soviet research on tularemia which includes summaries or research reports on its epidemiology, control, and evaluation of available vaccines.

AD-600 569 Div. 16
OTS Price $0.50

Institute of Contemporary Russian Studies, Fordham Univ., N. Y.
A BRIEF EVALUATION OF THE PROPHYLACTIC WORK AGAINST TULAREMIA IN THE SOVIET UNION.
by Robert Pollitzer. Apr 64, 6p
Contract DA18 108 405CML867A

Unclassified report

Descriptors: (*Pasteurella tularensis, Vaccines), (*Vaccines, Pasteurella tularensis), Public health, Disease vectors, Ticks, Rodents, Biological contamination, Water pollution, Cereals, Immunity, Bibliographies, USSR.

Studying the tularemia literature recently published in the Soviet Union it is found that most authors are convinced of the palliative nature of anti-tularemia immunization and therefore are fully aware of the necessity of supplementing the application of this prophylactic method by the implementation of measures directed against the rodent reservoirs of the infection and its intermediary vehicles like the ticks and other insects, contaminated sources of water supply and stores of agricultural products. (Author)

AD-600 573 Div. 16
OTS Price $1.00

Institute of Contemporary Russian Studies, Fordham Univ., New York.
A REVIEW OF SELECTED PROBLEMS OF TULAREMIA IN THE SOVIET UNION.
References to part II/A and B
by Robert Pollitzer. Feb 64, 31p
Contract DA18 108 405CML867A

Unclassified report

Descriptors: (*Pasteurella tularensis, Diseases), (*Bibliographies, Pasteurella tularensis), USSR.

This bibliography contains 293 annotated entries from Soviet literature. These references cover the fields of the epidemiology of tularemia, vaccine development, and control of disease vectors.

Descriptors: (*Cells (Biology), Wounds and injuries), (*Wounds and injuries, Cells (Biology)), *Healing, Cytology, Local anesthetics, Morphology (Biology), Chemical reactions, Transplantation, Tissues (Biology), Tissue culture.

Summaries of research on the following subjects are presented: (1) Action of local anesthetics on cells, (2) Morphological studies, (3) Differential action of chemicals on cell organoids, (4) Wound healing, and (5) Organotypic cultures.

AD-600 718 Div. 16
OTS Price $1.25

Texas A. and M. Univ., College Station.
SESSILE ORGANISM ACCUMULATION IN A NEARSHORE WATER COLUMN DURING A ONE YEAR PERIOD.
by R. D. Gaul and N. G. Vick. 10 Apr. 64, 48p TAMU Ref 64 10T
Contract Nonr2119 04 Proj. NR083 036

Unclassified report

Descriptors: *Aquatic animals, Marine biology, Identification, Classification, Barnacles, Mollusca, Fouling.

In the winter of 1963, a string of floats was installed at a position about two miles off shore from Panama City, Florida. One of the platforms was used as a base for data acquisition. This location was visited at bi-weekly intervals to photograph in situ the accumulation of marine organisms on the pairs of floats suspended at three levels. This report includes the photographic history so obtained and a partially annotated checklist of those major macroscopic organisms found on the floats after ten months in situ. No attempt at complete analysis of the species comprising the community which accumulated on the floats was made. However, certain prominent molluscs and barnacles, which made up a large fraction of the total volume of organisms, were used as indicators of gross accumulation.

AD-600 721 Div. 16
OTS Price $4.00

Curtiss-Wright Corp., Caldwell, N. J.
GERMFREE SURGICAL SYSTEM.
by C. Herbert Wheeler, Jr. Dec 63, 275p
Contract DA49 193MD 2167

Unclassified report

Descriptors: (*Germ-free atmospheres, Surgery), (*Surgery, Germ-free atmospheres), *Controlled atmospheres, Surgical techniques, Controlled atmospheres, Protective clothing, Medical equipment, Hospitals, Decontamination, Medical personnel, Helmets, Design, Control.

A Germfree Surgical System developed, fabricated and installed in Jacobi Hospital for the U. S. Army Medical Research and Development Command, Office of the Surgeon General is described.

AD-600 754 Div. 16, 15
OTS Price $0.50

RAND Corp., Santa Monica, Calif.
ESTIMATION OF HEART PARAMETERS USING SKIN POTENTIAL MEASUREMENTS.
Memo. rept.,
by R. Bellman, C. Collier, H. Kagiwada, R. Kalaba, and R. Selvester. May 64, 17p RM4138NIH
Grant PHS GM09608 02

Unclassified report

Descriptors: (*Galvanic skin response, Heart), (*Heart, Galvanic skin response), Cardiography, Electrocardiography, Mathematical models, Models (Simulations), Linear programming, Boundary value problems, Electric currents.

A mathematical model relating ventricular dipoles to surface potentials is sketched. Then it is shown that the inverse problem--that of determining heart parameters on the basis of skin potential measurements--may be viewed as a nonlinear multipoint boundary value problem. Some numerical experiments show that quasilinearization provides a feasible method of solution. (Author)

AD-600 773 Div. 16
OTS Price $0.50

Aviation Medical Acceleration Lab., Naval Air Development Center, Johnsville, Pa.
OBSERVATIONS ON ACUTE AND CHRONIC OXYGEN POISONING.
Interim rept.
by George H. Kydd and L. H. Betz. 21 Apr 64, 15p
NADC-MA 6331

Unclassified report

Descriptors: (*Oxygen consumption, Poisoning), (*Poisoning, Oxygen consumption), High pressure research, Decompression, Oxygen, Toxicity, Exposure, Convulsive disorders, Paralysis, Decompression sickness.

In an effort to discover the relationship between the occurrence of convulsions (acute effects) caused by oxygen at high pressure (OHP), and paralysis (chronic effects), susceptible rats have been repeatedly exposed to OHP under conditions that would tend to lessen the tendency toward the occurrence of convulsions. One group was lightly anaesthetized (10 mg/kg Nembutal) and the other exposed for a short time to maximum pressure and slowly decompressed. Of the anaesthetized animals, two developed paralysis without having exhibited any previous acute (convulsive) effects while four developed paralysis with only slight acute effects. All of the slowly decompressed rats convulsed and only two showed paralysis. These observations indicate that paralysis and convulsions are not necessarily associated symptoms of oxygen toxicity. (Author)

AD-600 777 Div. 16, 29, 30
OTS Price $0.75

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ULTRAVIOLET FLUORESCENCE MICROSCOPY.
by E. M. Brumberg. 28 Apr 64, 27p
FTD TT63 1178, TT 64 11741

Unclassified report

Unedited rough draft trans. of Zhurnal Obshchei Biologii (USSR) 1956, v. 17, no. 6, p. 401-412.

Descriptors: (*Microscopy, Fluorescence), (*Fluorescence, Microscopy), Ultraviolet radiation, Photomicrography, Color photography, USSR, Biology.

Topics include: observation of ultraviolet fluorescence of preparations; producing color pictures in fluorescent light by changing the wavelength of the exciting light; observation of visible fluorescence excited by short-wave UV light.

AD-600 785 Div. 16
OTS Price $0.75

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SOME RESULTS OF THE STUDY OF THE BIOLOGICAL EFFECT OF NEUTRONS AND PROTONS.
27 Apr 64, 23p
FTD TT63 1046, TT 64 11739

Unclassified report

Unedited rough draft trans. of mono. Nekotorye Itogi Izucheniya Biologicheskogo Deistviya Neitronov I Protonov, SM-44/54, n. p., 1963, 19p.

ditions of group flying, was continued. The new flight, through its characteristics, organization, duration and objectives, can be considered as a stage of the greatest importance in the progress of man's penetration into cosmic space. (Author)

AD-600 611 Div. 16, 8
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ISOTOPE METHODS OF RESEARCH IN A LIVING ORGANISM.
by N. A. Gabelova. 25 Mar 64, 12p
FTD TT63 1199; TT 64 11701

Unclassified report

Unedited rough draft trans. of mono. Electronika v Meditsine, Moscow/Leningrad, 1960, p. 338-347.

Descriptors: (*Tracer studies, Medical equipment), (*Radiography, Diagnostic agents), Radioactive isotopes, Distribution, Electronic equipment, Gamma rays, Scanning, Electronic scanners.

AD-600 613 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ELECTRICAL MEASUREMENT OF MECHANICAL QUANTITIES IN PHYSIOLOGICAL INVESTIGATIONS.
by E. B. Babskii and Ya. S. Yakobson. 23 Mar 64, 17p
FTD TT63-1192; TT 64 11703

Unclassified report

Unedited rough draft trans. of mono. Elektronika v Meditsine, Moscow/Leningrad, 1960, p. 79-90.

Descriptors: (*Measuring devices (Electrical and electronic), Biophysics), (*Transducers, Recording systems), Mechanical properties, Physiology, USSR.

Electrical methods of measuring mechanical quantities permit determination of weight and linear dimensions of samples, linear and angular displacements, torque, point forces and pressures, vibrations, and deformation. The measurement of all of these quantities is based on their conversion by transducers into electrical quantities which may be determined by using standard electrical measuring instruments. The use of transducers in physiological studies involves, in most cases, the application of a suitable amplifier. A discussion is given of the application of transducers which convert mechanical quantities directly into electrical signals. They are divided into two groups: (1) energetic or generator transducers and (2) parametric transducers.

AD-600 624 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
NEUROCYBERNETICS CONFERENCE.
by E. S. Khronika. 27 Apr 64, 5p
FTD TT64 49; TT 64-11707

Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Elektromekhanika (USSR) 1963 (v. 6) no. 1, p. 136.

Descriptors: (*Cybernetics, Neurology), (*Neurology, Cybernetics), Symposia, Brain, Memory, USSR, Bionics.

AD-600 641 Div. 16
OTS Price $2.50

Linde Co., Div. of Union Carbide Corp., Tonawanda, N. Y.
THE PHYSIOLOGICAL EFFECTS OF ARGON, HELIUM, AND THE RARE GASES.
Technical rept.
by H. R. Schreiner. 30 Apr 64, 104p
Contract Nonr4115 00; Proj. NR102 597

Unclassified report

Descriptors: (*Helium group gases, Physiology) (*Physiology, Helium group gases), Argon, Helium, Nitrogen, Cells (Biology), Neuromuscular transmission, Animals, Microorganisms, Electroencephalography, Decompression, Biochemistry.

These investigations are primarily concerned with the elucidation of effects of the metabolically inert gases helium, neon, argon, krypton, xenon, and of nitrogen on cellular systems, on the neuromuscular complex, and on intact animals. At this stage of research, it is concluded that metabolically inert gases are endowed with physical properties that bestow on them the ability to interact with a wide variety of biological systems on levels that range from the subcellular to that of the intact higher animal. A better understanding of the nature of these molecular interactions is sought in order to be able to anticipate the physiological effects of metabolically inert gases under unusual environmental circumstances.

AD-600 699 Div. 16
OTS Price $0.50

Western Reserve Univ., Cleveland, Ohio. School of Medicine.
METABOLISM OF PROTEIN, AMINO ACIDS AND AMMONIA IN PATIENTS WITH LIVER DISEASE.
Progress rept., 1 May 63-30 Apr 64
by George J. Gabuzda. May 64, 13p
Contract DA49 007MD749

Unclassified report

Descriptors: (*Hepatitis (Nonviral), Kidneys), (*Kidneys, Hepatitis (Nonviral), Metabolism, Amino acids, Proteins, Ammonia, Electrolytes (Physiology), Potassium, Sodium, Excretion, Toxic tolerances, Edema, Body fluids, Muscles, Ion exchange, Diet, Salts.

Renal function in patients with liver disease (hepatorenal syndromes), and the metabolic responses of man and animals to potassium deficiency and excess were studied. Renal responses to potassium loading were studied in salt-fed and salt-deprived normal subjects and in patients with ascites who are avid sodium retainers. The renal responses are conditioned by the degree of renal sodium conservation. Patients with ascites have abnormal responses to KCl loading. They show decreased H+ excretion and develop systemic acidosis. These data are evaluated in relation to the Na+, H+, K+ exchange system in the kidney. Studies on the effects of feeding amino acids on potassium and hydrogen ion metabolism in the rat have continued. Feeding L-lysine caused displacement of potassium from muscle and increases in urinary potassium excretion. These effects of L-lysine depended upon the availability of exchangeable potassium in muscle. L-lysine behaved like potassium in altering the amino acid pattern of potassium-deficient rat muscle in vivo.

AD-600 705 Div. 16
OTS Price $0.50

Pasadena Foundation for Medical Research, Calif.
CYTOLOGICAL ASPECTS OF INJURY AND REPAIR.
Annual progress rept. for 1 Aug 63-28 May 64
by C. M. Pomerat. 28 May 64 7p
Grant DA MD49 193 64G114

Unclassified report

AD-600 825 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A METHOD OF CONTINUOUS REGISTRATION OF LOCAL CEREBRAL BLOOD FLOW IN ACUTE AND CHRONIC EXPERIMENTS,
by D. I. Parolla. 28 Apr 64, 5p
FTD TT63 1175, TT 64 11674

Unclassified report

Unedited rough draft trans. of mono. Sbornik Voprosy Fiziologii i Patologii Nervnoi Sistemy, Moscow, 1958, p. 123-125.

Descriptors: (*Blood circulation, Brain), (*Brain, Blood circulation), Measurement, Medical equipment, Electroencephalography, Electrodes, Thermistors, Thermoelectricity, Temperature sensitive elements, Laboratory equipment, Microwave bridges, Microwave equipment.

A more accurate measure of the blood flow to the brain can be obtained by increasing the power supply to the bridge of electrodes which have been permanently inserted in brains of laboratory animals. The thermistor will then heat up. With a change in the amount of current flowing across the bridge, a thermoresistance heating to one degree higher than the temperature of the inflowing blood is obtained. The higher the density and heating conductivity of the ambient medium, the greater must be the current strength flowing through the thermoelectrodes. The advantages of this method for registering blood flow are the simplicity of the attachment regulating the power supplies to the bridge, and the significant increase in sensitivity in registering blood flow by thermoresistance.

AD-600 870 Div. 16, 2
OTS Price $2.60

Pacific Marine Station, Dillon Beach, Calif.
MAN AND THE SEA
by Joel W. Hedgpeth. 13 Apr 64, 28p

Unclassified report

A series of lectures delivered over KPFA, Berkeley, California, April 7-13, 1964.

Descriptors: *Marine Biology, *Oceanology, Scientific research.

The topics covered in this series of three lectures are the general principles of marine biology and oceanography, the role of marine biological stations in marine research, and the natural resources of the sea.

Descriptors: (*Radiation effects, Neutrons), (*Neutrons, Radiation effects), (*Protons, Radiation effects), Regeneration, Rhythm (Biology), Radiological dosage, Dose rate, Bibliographies.

AD-600 787 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
CONCERNING THE IMMUNOLOGICAL, BIOLOGICAL AND CYTOLOGICAL PROPERTIES OF MALIGNANT TUMORS IN HETEROTRANSPLANTATION AND EXPLANTATION.
by M. S. Lomakin. 28 Apr 64, 19p
FTD TT63 1172; TT 64 11740

Unclassified report

Unedited rough draft trans. of Arkhiv Patalogii (USSR) 1959, v. 21, no. 7, p. 65-72.

Descriptors: (*Immunity, *Cancer), (*Cancer, Immunity), *Transplantation, Cells (Biology), Adaptation (Physiology), Antigens and antibodies, Cytology, Tissues (Biology), Antigen-antibody reactions, Allergy.

An analysis of the current data in the literature on the immunobiological properties of malignant tumors during their growth under environmental conditions not characteristics to them. A list of 37 references is included. These are from both Soviet and Foreign literature.

AD-600 802 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
NEW TYPES OF CHROMOSOME ABERRATIONS APPEARING IN MICROSPORES OF TRADESCANTIA PALUDOSA UNDER THE EFFECT OF CERTAIN SPACE FLIGHT FACTORS.
by N. L. Delone, P. R. Popovich, V. V. Antipov and V. G. Vysotskii.24 Apr 64, 11p
FTD TT64 216, TT 64 11660

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady, 1963, v. 152, no. 5, p. 1227-1230.

Descriptors: (*Chromosomes, Mutations), (*Mutations, Chromosomes), (*Genetics, Space flight), (Space flight, Genetics), Space biology, Spores, Plants (Botany), Cells (Biology), Cell division, Meiosis, Mitosis, Microsomes, Acceleration, Radiation effects, Radiobiology.

AD-600 806 Div. 16
OTS Price $1.60

Army Prosthetics Research Lab., Walter Reed Army Medical Center, Washington, D. C.
EXPANSIBLE-SHRINKABLE SOCKETS
by James T. Hill and Donald R. Igenito. Apr 63, 19p
Proj. 6X59 01 001 04
APRL TR6304

Unclassified report

Descriptors: (*Prosthetics, Laminated plastics) (*Laminated plastics, Prosthetics) Amputation stumps, Models (Simulations), Joints (Physiology), Expansion joints.

The design criteria necessary for the fabrication of forms suitable to make and expand laminates of sufficient shape and size so that upon post heating the expanded laminate would shrink to the exact contour of the stump shape being fitted are discussed. Fifteen to twenty basic preforms would be necessary to fit the majority of B.E. amputees. The porous laminate system was evaluated and found to be unsatisfactory in that effective expansions of only 35% were obtainable whereas a minimum of 70% would be required to make the system at all feasible; in addition the physical properties of the laminates were very poor. The overall practicality of introducing the expansible-shrinkable system into the limb industry is discussed. (Author)

AD-600 808 Div. 16
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EFFECT OF DIURETICS ON THE AMINOACID CONTENT OF THE SERUM AND URINE: QUICK METHOD SUITABLE AS SCREENING TEST TO DETERMINE TOTAL ALPHA-AMINO NITROGEN.
by Pal Braun, Maria Hauk, Istvan Horvath, and Attila Szentirmay. 27 Apr 64, 10p
FTD TT63 1021, TT 64 11661

Unclassified report

Edited trans. of Orvosi Hetilap (Hungary) 1962, v. 103, no. 41, p. 1933-1935.

Descriptors: (*Diuretics, Physiology), (*Amino acids, Diagnostic agents), (*Diagnostic agents, Amino acids), Urine, Blood serum, Ethylenedinitrilo tetracetates, Colorimetric analysis, Mercury compounds, Drugs, Nitrogen.

Description of a simple method for the determination of the total alpha-amino-nitrogen content of the serum and urine through the ninhydrin reaction. After quick preparation, the material, which is placed on alkaline paper discs, may be stored without deterioration and may be reactivated (developed) at any required time. Mercury-containing and mercury-free diuretics in the usual dosages do not influence the amino-acid level of the serum and urine. (Author)

AD-600 812 Div. 16, 4, 14
OTS Price $0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
TOXICITY OF CERTAIN ISOALCOHOLS, HIGHER ALCOHOLS, AND MELAMINE-FORMALDEHYDE RESINS,
by K. P. Stasenkova and R. N. Mel'nikova. 28 Apr 64, 6p
FTD TT64 97, TT 64 11665

Unclassified report

Unedited rough draft trans. of Toksikologiya Novykh Promyshlennykh Khimicheskikh Veshchestv (USSR) 1961, no. 3, p. 108-112.

Descriptors: (*Alcohols, Toxicity), (*Amino plastics, Toxicity), Vapors, Skin, Membranes (Biology), Sensitivity, Butanols, USSR.

A study was made of the toxicity of isoalcohols with boiling ranges of 112-148 C and 138-175 C, higher alcohols with boiling ranges of 165-225 C three forms of melamine-formaldehyde resin based on the above substances, and also a melamine-formaldehyde resin produced from a mixture of butanol and isoalcohols of fractions which boil at 112-148 C. The substances were found to cause narcosis and irritation of mucous membranes. The toxic effect is displayed to a greater extent by alcohols with fewer carbon atoms and lower boiling ranges.

ALLOYS AFTER MULTIPLE TEMPERATURE EXPOSURES.
15 Apr 64, 11p. FZM12 249
Contract AF33 657 11214
Unclassified report

Descriptors: (*Aluminum alloys, Compressive properties), Temperature.

AD-600 043 Div. 17
OTS price $1.60

IIT Research Inst., Chicago, Ill.
HIGH-TEMPERATURE OXIDATION PROTECTIVE COATINGS FOR VANADIUM-BASE ALLOYS.
Bimonthly rept. no. 3, 1 Feb-31 Mar 64,
by Larry I. Kane and John J. Rausch. 1 May 64, 13p. IITRI B6019 3
Contracts NOw64 0140, NOw61 0806
Unclassified report

Descriptors: (*Refractory coatings, Corrosion inhibition), (*Vanadium alloys, Refractory coatings), Coatings, Oxides, Films, Mechanical properties, Stresses, High-temperature research, Powder metals, Tin, Silicon, Silver, Copper, Aluminum, Niobium.

The objective is the development of oxidation protective coatings for vanadium-base alloys for use at 1800 to 2500 F. The effect of the pack siliconizing process on the mechanical properties of .020 inch thick sheet of V-60 w/o Cb - 1 w/o Ti is being studied. Samples are being evaluated before and after various high temperature exposures. Development of an oxidation resistant slurry or liquid cementation type coating for V-60 w/o Cb - 1 w/o Ti is progressing. Five slurry compositions containing tin, silicon, silver, copper, aluminum, and columbium were investigated, and several of these showed good coverage, even at corners and edges. (Author)

AD-600 070 Div. 17
OTS price $.50

Naval Research Lab., Washington, D. C.
THE SOLUBILITY OF COLUMBIUM-1% ZIRCONIUM IN SODIUM BY ACTIVATION ANALYSIS.
by T. A. Kovacina and R. R. Miller. 20 Mar 64, 9p.
NRL 6051 Unclassified report

Descriptors: (*Niobium alloys, Zirconium alloys), (*Zirconium alloys, Niobium alloys), (*Refractory metal alloys, Solubility), Sodium, Liquid metal coolants, Heat exchangers, Compatibility, Liquid metal cooled reactors, Radioactivation analysis.

The equilibrium solubility of the refractory alloy (Cb-1% Zr) in liquid sodium in the temperature range of 800 to 1380 C was determined under static, isothermal conditions. The standard comparator method of activation analysis was used to determine the columbium and zirconium content of the equilibrated sodium samples. The solubility ranges were estimated to be 0.25 to 250 ppm and 0.08 to 4 ppm by weight for columbium and zirconium, respectively. (Author)

AD-600 086 Div. 17
OTS price $.50

Climax Molybdenum Co. of Michigan, Detroit.
THE DEVELOPMENT AND EVALUATION OF TUNGSTEN-BASE ALLOYS.
Progress rept., 10 Jan-10 Apr 64,
by M. Semchyshen, Robert Q. Barr and Eric Kalns. 10 Apr 64, 11p. CLIMAX-D
Contract NOw64 0057
Unclassified report

Descriptors: (*Tungsten alloys, Metallography), (*Metallurgy, Tungsten alloys), Vacuum apparatus, Casting, Extrusion, Mechanical properties.

Tungsten-base alloys of the following nominal compositions were prepared by the vacuum-arc-casting process: (1) W + 0.1% Zr + 0.01% C, (2) W + 0.25% Hf + 0.02% C, (3) W + 0.5% Zr + 0.002% C, and (4) W + 0.5% Hf + 0.04% C. One blank from each ingot was subjected to the extrusion process at the Air Force ASD extrusion facility. Wrought bar stock was obtained from ingots containing 0.5% Zr and 0.5% Hf, while blanks prepared from the other two heats stalled the extrusion press. The recrystallization behavior of the wrought bar stock is now being studied, and preparation of tensile test specimens from the successfully extruded bars is in progress. (Author)

AD-600 088 Div. 17
OTS price $2.25

Defense Metals Information Center, Columbus, Ohio.
U. S. GOVERNMENT METALWORKING PROCESSES AND EQUIPMENT PROGRAM.
Status rept.,
by F. C. Holden and F. W. Boulger. 18 Mar 64, 91p. DMIC DMIC201
Contract AF33 615 1121, Proj. 8975
Unclassified report

Descriptors: (*Material forming, Metals), (*Bibliographies, Material forming), Beryllium, Alloys, Steel, Refractory metals, Processing, Deformation, Plasticity, Strain (Mechanics), Friction, High-pressure research, Ultrasonic radiation, Surface properties, Grain structures (Metallurgy), Metallic crystals, United States Government, Reports, Abstracts.

A summary is given of the status of the various contracts involved in the U. S. Government's Metalworking Processes and Equipment Program. (Author)

AD-600 112 Div. 17
OTS price $1.00

Army Frankford Arsenal, Philadelphia, Pa.
CELLULAR ALUMINUM FOR USE IN ENERGY DISSIPATION SYSTEMS.
Technical rept.,
by S. Lipson. Apr 64, 38p.
AFA R1716 Unclassified report

Descriptors: (*Aluminum alloys, Cylindrical bodies), (*Porous metals, Mechanical properties), (*Castings, Material forming), (*Structures, Loading (Mechanics)), (*Energy, Absorption), (*Energy management, Spacecraft), Heat treatment, Hardness.

The compressive properties of cast cellular aluminum alloy cylinders were studied. The principal criterion for material evaluation was high energy absorption at uniform levels of loading through substantially complete destruction of the material. The effects of alloy composition, cell structure, heat treatment, and length/diameter (1/d) ratio were studied. The most promising material was a cast 7075 aluminum alloy, heat treated to high hardness levels. The following conclusions were drawn: Cellular cylinders of 7075-T6 material having uniform cell size and appropriate 1/d ratios can provide for at least 15,000 ft-lb/lb of energy dissipation when the cylinder height has been reduced by 70 percent. High strength compositions heat

17. METALLURGY

AD-600 000 Div. 17, 10
OTS price $3.50

Pennsalt Chemical Corp., Philadelphia, Pa.
THE COMPATIBILITY OF WELDED STRUCTURAL MATERIALS WITH CHLORINE TRIFLUORIDE, PERCHLORYL FLUORIDE AND A MIXTURE OF THESE.
Technical summary rept., Apr 62-Jan 64,
by John C. Grigger and Henry C. Miller. Feb 64, 247p.
Contract AF33 657 8461, Proj. 7381, Task 738103
ML TDR64 22 Unclassified report

Descriptors: (*Aluminum alloys, Corrosion), (*Nickel alloys, Corrosion), (*Stainless steel, Corrosion), (*Oxidizers, Compatibility), Chlorine compounds, Halocarbon plastics, Fluorides, Perchloryl radicals, Bipropellants, Storage, Pipes, Erosion, Welds.

Compatibility and corrosion rates of nine welded alloys of aluminum, nickel and stainless steel, stressed and unstressed, in ClF3, ClO3F and 25% ClO3F-75% ClF3 at 30 and 66 C were investigated. Corrosion rates at 30 C were all less than 0.1 mil/yr. At 66 C, corrosion in ClF3 and Halox 25 was less than 0.1 mil/yr except for Type 410 S.S. (1-2.2 mil/yr). In ClO3F at 66 C corrosion was normally below 0.5 mil/yr, but with moisture present, rates up to 8.3 mil/yr were observed. No change in mechanical properties and no stress cracking due to oxidizer corrosion occurred. There was no interface corrosion. In an ambient temperature, high-pressure loop, liquid flows of ClF3 and ClO3F at 100 ft/sec through orifices in aluminum, nickel and stainless steel caused no erosion. A Teflon orifice was attacked by ClF3. Liquid impingement jets of ClF3 and ClO3F at 100 ft/sec had no effect on these metals except for a slight pit in aluminum 2014-T6 with ClF3. Liquid cavitation of ClF3 and ClO3F in an aluminum tube caused no metal change. (Author)

AD-600 008 Div. 17
OTS price $2.50

ManLabs, Inc., Cambridge, Mass.
INVESTIGATION OF FRACTURE TOUGHNESS IN HIGH STRENGTH ALLOYS.
Rept. for 15 Aug 62-15 Aug 63,
by B. S. Lement, K. Kreder and H. Tushman.
Jan 64, 120p.
Contract AF33 616 8155, Proj. 7381, Task 738103
ASD TDR62 868, pt. 2 Unclassified report

Descriptors: (*Steel, Toughness), (*Fracture (Mechanics), Steel), Airplane panels, Alloys, Tensile properties, Heat treatment, Stresses, Metallography, Grain structures (Metallurgy), Fractography.

A comprehensive investigation of the fracture toughness of 4335-V steel tempered in the range of 400 to 800 F was carried out based primarily on precracked Charpy impact and slow bend tests of regular and brittle-boundary specimens with thicknesses in the range of about 0.04 to 0.40 inch. These tests were supplemented by notched and unnotched tensile tests, and by metallographic and fractographic examinations using both light and electron microscopy. (Author)

AD-600 029 Div. 17, 14
OTS price $1.00

Coating and Chemical Lab., Aberdeen Proving Ground, Md.
THE CORROSIVITY OF MAGNESIUM ALLOYS IN 5 AND 20 PERCENT SALT FOG ENVIRONMENTS,
by A. P. De Marco. 13 Mar 64, 32p.
Proj. I H024401A110 05
CCL 161 Unclassified report

Descriptors: (*Magnesium alloys, Corrosion), (*Corrosion inhibition, Plastic coatings), (*Epoxy plastics, Plastic coatings), Castings, Sheets, Protective treatments, Coatings, Salt spray tests, Combinatorial analysis.

The report presents the results and analysis of a factorial experiment undertaken to determine the corrosivity of variously protected magnesium alloys when exposed to 5 and 20 percent salt fog environments. The investigation considers two lots of magnesium sand castings and one lot of magnesium sheet alloy, each given two preparatory chemical pretreatments and coated with three different batches of a thermosetting epoxy resin coating using two methods of application. For cast magnesium alloy, corrosion was noted to vary widely within and between the alloy lots investigated and their pretreatments. The relative corrosivity of the exposure environments on the alloy lots was found to depend upon the pretreatment used. For the more corrosion resistant pretreatment, 20 percent salt fog was substantially more corrosive than 5 percent. For the less effective pretreatment, no significant difference in the corrosivity of the two salt fog environments was apparent. For sheet magnesium alloy, corrosion was significantly less extensive and less variable than for cast alloy in both exposure environments. Regardless of the pretreatments, coatings used, and methods of application, 20 percent salt fog was found substantially more corrosive than 5 percent. (Author)

AD-600 034 Div. 17
OTS price $1.25

General Dynamics/Fort Worth, Tex.
MATERIALS - 4340 STEEL - STRESS CORROSION AND EFFECTS OF BANDING - LITERATURE SURVEY.
PART II: EFFECTS OF BANDING,
by P. F. Ghena. 23 Mar 64, 49p. FGT2957 P2
Contracts AF33 657 11214, AF33 600 41891
Unclassified report

Descriptors: (*Steel, Grain structures (Metallurgy)), (*Grain structures (Metallurgy), Reviews), Castings, Hardening, Hot working, Alloys, Diffusion, Landing gear, Failure (Mechanics).

Banding is caused by segregation of the alloying elements in ingots during solidification. During subsequent hot working operations the segregation is aligned in the direction of working and results in a banded appearance of the microstructure. The diffusion rates of the alloying elements in steel control the homogenization of the ingot, chromium and molybdenum homogenizing readily and nickel very slowly. The increase in properties by homogenizing does not warrant the involved process of homogenizing, then refining the resulting large grain size. The fact that design can orient the plane of maximum stress in a direction parallel to the working direction of the stock or forging, it is felt, has lead to the economic infeasibility of performing the very involved and costly task of homogenization. This behoves the designer to take as much advantage of controlling grain flow as possible. (Author)

AD-600 035 Div. 17
OTS price $.50

General Dynamics/Fort Worth, Tex.
COMPRESSION PROPERTIES OF SELECTED ALUMINUM

Descriptors: (*Refractory metals, Sheets), (*Molybdenum alloys, Mechanical properties), (*Tungsten, Mechanical properties), Titanium alloys, Zirconium alloys, Mechanical properties, Sheets, Recrystallization, Tensile properties.

Progress is reported on a program to determine preliminary design information for tungsten and TZM molybdenum sheet produced in Phase I of the refractory metal sheet rolling program. This report covers preparation of the tungsten and TZM specimens for most of the different type of evaluations, continued the tensile tests on the tungsten sheet, determined the recrystallization characteristics of the three TZM materials, and determined the bend-transition temperature of the TZM sheet in the optimum condition. (Author)

AD-600 327 Div. 17, 25
OTS price $2.60

Metallurgical Research Labs., Syracuse Univ., N. Y.
CRACK INITIATION IN METALLIC MATERIALS.
Quarterly progress rept. no. 1,
by V. Weiss, P. Packman, G. Nash and K. Schroder.
Apr 64, 25p. MET E1160 0464QP1
Contract NOw64 0275d
Unclassified report

Descriptors: (*Fracture (Mechanics), Metals), (*Lithium compounds, Fluorides), Failure (Mechanics), Crystal lattice defects, Single crystals, Surface properties, Stresses, Stainless steel, Load distribution, Curve fitting, Sheets.

Conditions for crack initiation as a function of test specimen geometry, test material, testing conditions and internal structure of the material were investigated. Lithium fluoride was used to give information concerning the dislocation moments and arrangement at and near existing cracks. The results include the effects of dislocation arrangements in lithium fluoride single crystals near existing cracks.

AD-600 363 Div. 17, 25
OTS price $2.25

Battelle Memorial Inst., Columbus, Ohio.
SURVEY OF CURRENT KNOWLEDGE OF THE DEFORMATION CHARACTERISTICS OF BERYLLIUM AND THE REFRACTORY METALS.
Quarterly progress rept. no. 3, 15 Dec 63-13 Mar 64,
by F. W. Boulger, A. R. Rosenfield, and D. E. Strohecker. 22 Apr 64, 87p.
Contract N600 19 60240
Unclassified report

Descriptors: (*Beryllium, Deformation), (*Refractory metals, Mechanical properties), Extrusion, Aging (Materials), Hardening, Steel, Heat treatment, Tungsten, Molybdenum, Recrystallization, Refractory metal alloys, Sheets, Tensile properties, Aluminum, Titanium, Stresses, Carbon alloys, Machine tools, Niobium, Copper, Lead, Temperature, Phase studies.

During this reporting period, the technical effort was concentrated on preparing interpretive reports on the extrusion process, the mechanisms and effects of dynamic strain aging, and the relationships among thermomechanical treatments and the resulting properties of metals. The articles on the latter two topics have not progressed far enough to be included in this report. The draft of the engineering analysis of the extrusion process is appended to this report. It is anticipated that the articles on the other two subjects will be completed and that reports will be prepared on the rolling and forging processes during the next quarter. (Author)

AD-600 375 Div. 17
OTS price $2.50

Boeing Co., Seattle, Wash.
AN INVESTIGATION OF LOW-CYCLE FATIGUE FAILURES USING APPLIED FRACTURE MECHANICS.
Technical documentary rept., 15 Feb 63-15 Feb 64,
by C. F. Tiffany and P. M. Lorenz. May 64, 106p.
D2 23141
Contract AF33 657 10251, Proj. 7381, Task 738101
ML TDR64 53 Unclassified report

Descriptors: (*Steel, Fracture (Mechanics)), (*Titanium alloys, Fracture (Mechanics)), (*Maraging steels, Fracture (Mechanics)), Fracture (Mechanics), Fractography, Aluminum alloys, Vanadium alloys, Nickel alloys, Experimental data, Life expectancy, Metal plates, Pressure vessels, Mechanical properties.

Basic principles of fracture mechanics were applied to the investigation of cyclic flaw growth characteristics of Ladish D6A-C steel, tested at room temperature; 6Al-4V titanium, tested at -320 F; and 18Ni(300) maraging steel, tested at room temperature using uniaxially loaded, preflawed (fatigue cracked) test specimens. Applicability of such data to prediction of the cyclic life span of biaxially loaded pressure vessels has been verified by testing six 17-inch-diameter, preflawed Ladish D6A-C test tanks. A brief discussion of technical background illustrates the experimental approach and the significance of resulting test data. A method for utilization of NDT inspection and proof-pressure testing in conjunction with the cyclic flaw growth data for design purposes is also presented. (Author)

AD-600 383 Div. 17, 25
OTS price $.75

Vienna Univ. (Austria).
INVESTIGATION OF THE EFFECTS OF ULTRASONICS ON THE DEFORMATION CHARACTERISTICS OF METALS.
Final rept., 1 Feb 63-31 Jan 64.
31 Jan 64, 25p.
Contract N62558 3436
Unclassified report

Descriptors: (*Metals, Deformation), (*Ultrasonic radiation, Metallic crystals), Zinc, Aluminum, Crystal structure, Non-destructive testing, Test methods, Mechanical properties, Stresses, Hardening, Plasticity, Recrystallization, Aging (Materials), Aluminum alloys, Copper alloys, Magnesium alloys.

The softening and hardening effect of irradiation was investigated by means of static tensile tests using simpliest test samples (metal crystals, zinc and aluminum). Softening occurs, if irradiation is superimposed on the static strain during deformation. It may become so marked that the samples may be deformed practically without stresses. Crystals thus deformed, however, prove to be hardened to a great extent. Hardening can also be observed with samples, which to a certain extent only were deformed with superimposed ultrasonics. This implies that softening occurs during superimposed irradiation, whereas a hardening takes place as soon as irradiation is ceased (superposition of two processes possible, one of them being prevailing). This hardening effect occurring after straining is proven by tests in which increasing straining with ultrasonics took place prior to the static tensile test. The extent of prestrain of samples turns out to be of utmost importance for

treated to optimum strength levels offer the best promise for dissipation of energy at relatively constant levels of loading. Uniform cell size in the cellular structure favors uniform loading through the compressive deformation of the material. High 1/d ratios (more than 1.5) result in columnar instability and early catastrophic failure of the material. (Author)

AD-600 150 Div. 17, 26
OTS price $1.00

Ladish Co., Cudahy, Wis.
DEVELOPMENT AND STATISTICAL ANALYSIS EVALUATION OF MELTING AND TRANSVERSE PROPERTIES OF HIGH-STRENGTH (H-11 TYPE) STEEL.
Interim engineering rept. no. 6, 1 Jan-1 May 64, by Jack A. Yoblin and Robert F. Zuehlke. May 64, 39p.
Contract AF33 600 38767, Proj. 7 678
ASD TR7 678 V6 Unclassified report

Descriptors: (*Steel, Heat treatment), (*Melting, Vacuum apparatus), Statistical analysis, Vacuum furnaces, Electric arcs, Mechanical properties, Specifications, Ductility, Forging, Selection, Manufacturing methods, Electrodes, Statistical tests.

Four heats of H-11 material processed by vacuum induction melt-vacuum arc remelt technique have been received by the Contractor. Material was ordered to a specification which requires an average transverse ductility of 12% reduction of area at the 300-330 Ksi ultimate strength level. Material has been processed through complete acceptance testing and has been released for continuation of billet testing and production of the selected forgings. (Author)

AD-600 152 Div. 17, 14
OTS price $1.10

Pfaudler Co., Rochester, N. Y.
INVESTIGATION OF PRACTICAL TECHNIQUES FOR COATING REFRACTORY METALS.
Quarterly progress rept. no. 1, 1 May-31 July 63, by J. Zupan, E. G. Pike, and J. B. Whitney.
15 Aug 63, 9p. PF63 9
Contract AF33 657 8920
NP 13758; N63 22096 Unclassified report

Descriptors: (*Refractory metals and alloys, Coatings), (*Aluminum alloys, Refractory coatings), Zirconium alloys, Metal coatings, Silicon, Feasibility studies, Protective treatments, Niobium, Tungsten, Oxides, Particles.

Studies are being continued to develop practical techniques for applying protective coatings to refractory metal alloys. The D-14 alloy (Cb-5Zr) currently being used as the substrate will be replaced early in the program with D-43 (Cb-10W-1Zr). Initial experiments have been carried out to establish the feasibility of fused salt bath deposition as a continuous process. Results are promising. Experimental work underway on the fluidized bed process has been chiefly concerned with the evaluation of the fluidizing characteristics of various silicon-alumina mixtures. The furnace and its controls for the 8-in. dia fluidized bed have been received and are being installed. Electrokinetic and rheological studies of particles are being continued to obtain basic data for use in the design of slurry process systems. Current efforts are the investigation of water stabilizers and bisque strengtheners. (Author)

AD-600 188 Div. 17
OTS price $.50

Naval Research Lab., Washington, D. C.
NOTCH TOUGHNESS OF THREE LOW-ALLOY STEELS AT ELEVATED TEMPERATURES,
by George Sandoz. Apr 64, 11p.
Proj. RR007 01 46 5411
NRL MR1523 Unclassified report

Descriptors: (*Steel, Mechanical properties), (*Toughness, High temperature research), Alloys, Fracture (Mechanics), Load distribution, Steam pipes, Chromium alloys, Chemical analysis, Metal plates, Thickness, Manganese alloys, Nickel alloys.

The data indicate that the candidate steel HY-80 might justify fuller consideration for high temperature service where there is concern about a rapidly running low-energy shear fracture initiated by a large flaw. The Charpy V-notch energy values of steel 'A', however, are probably too low to assure immunity from catastrophic low-energy shear fractures during service within the temperature range studied. (Author)

AD-600 277 Div. 17
OTS price $2.00

Southwest Research Inst., San Antonio, Tex.
NONDESTRUCTIVE EVALUATION OF METAL FATIGUE.
Final rept.,
by Felix N. Kusenberger, John R. Barton and W. Lyle Donaldson. 13 Mar 64, 78p.
Contract AF49 638 1147
AFOSR 64 0668 Unclassified report

Descriptors: (*Metals, Fatigue (Mechanics)), (*Fatigue (Mechanics), Metals), (*Non-destructive testing), Hall effect, Probe (Electromagnetic), Stresses, Loading (Mechanics), Microstructure, Surface properties, Magnetic fields, Life expectancy.

This report includes a discussion of the magnetic techniques and magnetic inspection - fatigue . tester equipments. The design and construction of new electronics for use with the Bismuth Hall probes is summarized. Results obtained from fatigue tests to determine the required stress level for reasonable life are analyzed, and photographs of many fracture surfaces are included. A brief summary of the nondestructive detection of fatigue damage using the magnetic inspection equipment is given. Relationships between magnetic signals and visible fatigue damage prior to failure are presented. The effects of magnetic field strength and static loads applied during inspection on the fatigue damage indications are summarized. A detailed discussion of the inspection results obtained on seven stress cycled specimens is included. Many magnetic inspection records, surface photographs and graphs illustrating the occurrence and characteristics of the magnetic signals which indicate fatigue damage development are presented. Other experiments which include the programmed loading of a fatigue damaged specimen and the determination of residual stresses in the vicinity of a fatigue crack are discussed. (Author)

AD-600 281 Div. 17
OTS price $2.25

Southern Research Inst., Birmingham, Ala.
MECHANICAL AND PHYSICAL PROPERTIES OF TZM MOLYBDENUM ALLOY SHEET AND OF TUNGSTEN SHEET.
Quarterly progress rept. no. 6, 1 Feb-30 Apr 64.
15 May 64, 85p. SRIB6774 1479 6
Contract N600 19 59530
Unclassified report

impact, bend, fatigue, creep, and rupture properties of the 18 per cent nickel maraging steels and on the effect of temperature on these properties. Data for the properties of sheet, bar, and forgings, as well as data illustrating the effect of cold rolling, variation in the heat treatment, and elevated-temperature exposure also are presented. Data on the effect of specimen orientation, which are also included, indicate that the ductility and toughness of specimens designed to evaluate the properties in the short transverse direction are somewhat lower than in the other directions. The high strength and toughness that can be obtained in the 18 per cent nickel maraging steels make them attractive for certain critical applications that require these properties. The fabrication characteristics, weldability, and simple heat treatment are other advantages of these steels. (Author)

AD-600 457 Div. 17, 25
OTS price $.75

Boeing Scientific Research Labs., Seattle, Wash.
THERMAL CONDUCTIVITY OF COPPER-NICKEL ALLOYS AT 4.2 K,
by Joachim C. Erdmann and James A. Jahoda. Apr 64, 25p. D1 82 0333
Unclassified report

Descriptors: (*Cryogenics, Thermal conductivity), (*Copper alloys, Thermal conductivity), (*Nickel alloys, Crystal lattices), Electrical conductance, Phonons, Scattering, Plasticity, Deformation, Chemical analysis, Heat treatment, Grain structures (Metallurgy), Phase studies, Computers, Weight.

The lattice thermal conductivity of the complete Cu-Ni alloy series at 4.2 K has been derived from the measurement of the total thermal conductivity and the electrical residual resistivity of annealed specimens. It was found that copper-rich alloys decrease with increasing content of nickel. For the most nickel-rich alloy (Cu 02 - Ni 98) indications of additional phonon scattering processes, perhaps by spin-disorder, are found. The influence of plastic deformation has been measured and is briefly discussed. (Author)

AD-600 515 Div. 17
OTS price $1.75

Massachusetts Inst. of Tech., Cambridge.
MICROMECHANISMS OF CLEAVAGE FRACTURE IN POLYCRYSTALLINE IRON.
Progress rept. no. 6,
by Charles J. McMahon, Jr. May 64, 62p.
Contract NObs88279
SSC 161 Unclassified report

Report on Metallurgical Structure.

Descriptors: (*Fracture (Mechanics), Iron), (*Iron, Fracture (Mechanics)), Ferrites, Grain structures (Metallurgy), Tensile properties, Metallography, Carbides, Ductility, Brittleness, Phase studies.

The initiation and propagation of cleavage microcracks in coarse-grained vacuum-melted ferrite, containing 0.035 and 0.007 per cent carbon, were studied by means of tensile tests carried out between room temperature and -196 C, and by special metallographic procedures. Cleavage microcracks develop in ferrite during the strain-hardening portion of the stress-strain curve at low temperatures, and are initiated mainly by cracks which form in the carbides. Twinning does not play an important role in crack initiation over the entire temperature range studied. Carbide cracks during plastic deformation at all temperatures investigated, but they lead to microcracks in the ferrite only when the applied stress is high enough to permit the carbide cracks to act as Griffith cracks. Carbide cracks also lead to the formation of large voids during the necking of specimens tested in the ductile and transition temperature regions. Pre-existing twins provide strong barriers to microcrack propagation. Twinning also causes the disappearance of the discontinuous-yield phenomenon at low temperatures. A model for microcrack initiation by carbide cracking is proposed, and the conditions leading to brittle fracture are discussed. (Author)

AD-600 520 Div. 17, 1
OTS price $2.75

Nuclear Metals, Inc., Concord, Mass.
DEVELOPMENT OF IMPROVED FABRICATION METHODS, PROCESSES, AND TECHNIQUES FOR PRODUCING TYPICAL AIRCRAFT SHAPES FROM BERYLLIUM.
Final technical documentary rept., 15 July 62-30 Nov 63,
by R. G. Jenkins, J. M. Siergiej, A. K. Wolff and J. L. Klein. 29 May 64, 137p. NMI9701 15
Contract AF33 657 8783, Proj. MMP7 644A
ML TDR64 108 Unclassified report

Descriptors: (*Airframes, Production), (*Beryllium, Mechanical properties), Lubricants, Material forming, Dies, Drawing (Machine processing), Materials, Extension, Aircraft, Configuration.

A basic procedure has been developed for warm drawing long lengths of a complex beryllium structural shape to accurate dimensions. The starting shape was a U-channel extrusion having a 1-1/2 inch wide web, 1 inch high flanges, and a thickness of flange and web of 60 to 100 mils. Draw reductions of up to 16 percent were obtained in a single pass, and reductions of up to 39 percent were obtained by multiple draws. The maximum length drawn was approximately 10 feet. Large increases in longitudinal and transverse strength properties at room temperature and at -100 F are obtained by drawing at 800 F; on the average the increase in yield strength is approximately 2500 psi per one percent drawing reduction. However, drawing reduces the ductility; for example, the longitudinal room temperature ductility of approximately 6 percent is reduced to approximately 2 percent by a 14 percent draw reduction. Annealing after drawing reduces the strength but does not restore the ductility. Both strength and ductility are higher in the longitudinal direction than the transverse direction. The preferred orientation of the basal planes caused by extrusion is not changed appreciably by drawing. (See also AD-299 006) (Author)

AD-600 563 Div. 17, 4
OTS price $.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
THE ELECTROCHEMICAL BEHAVIOR OF ARMCO IRON IN SULFURIC ACID.
Technical note,
by Howard A. Porte and Thomas E. Nappier.
31 Jan 64, 26p.
Task Y R011 01 01 035
NCEL N568 Unclassified report

Descriptors: (*Iron, Electrochemistry), (*Iron, Corrosion), Corrosive liquids, Sulfuric acid, pH, Polarization.

The polarization behavior of Armco iron in sulfuric acid solutions was investigated. Anodic and cathodic polarization curves were obtained

the effect of irradiation. Whereas with low degrees of plastic deformation irradiation hardens, this effect passes into a softening with high degrees of plastic pre-deformation. Experiments with zinc crystals proved that thermal recovery occurs much faster with samples hardened by irradiation than with cold-worked ones. (Author)

AD-600 391 Div. 17, 14
OTS price $3.50

TRW Electromechanical Div., Thompson Ramo Wooldridge, Inc., Cleveland, Ohio.
DESIGN DATA STUDY FOR COATED COLUMBIUM ALLOYS.
Final summary technical rept., 1 Mar 63-1 Mar 64,
by D. B. Warmuth. 30 Mar 64, 208p. TRW ER5885
Contract NOw63 0471c
Unclassified report

Descriptors: (*Niobium alloys, Protective treatments), (*Metal coatings, Oxidation), High temperature research, Silicides, Mechanical properties, Creep, Deformation, Tensile properties, Metal joints, Ballistics, Toughness, Titanium alloys, Chromium alloys, Silicon alloys.

Design data properties were determined for four protective coating columbium alloy systems involving Pfaudler and TRW oxidation protective coatings on B-66 and D-43 columbium alloys up to 2600 F. Prior to the design data study, preliminary oxidation (low pressure and one atmosphere), bend and tensile tests were conducted on B-66 and D-43 alloys using two different Pfaudler coatings and the TRW Cr-Ti-Si coating. Based on these evaluation tests the Pfaudler single-cycle silicide coating and the TRW coating were selected for the mechanical properties evaluation. The following design properties were determined for the four coating-base metal systems: (a) cyclic oxidation protective life, (b) tensile properties of uncoated sheet in vacuum and coated sheet in air, (c) creep properties of coated sheet in air and (d) coating deformation tolerance. In addition, a limited evaluation of (a) the ballistic impact resistance of the coatings at room temperature and (b) the tensile properties of coated joints was conducted. (Author)

AD-600 403 Div. 17, 26
OTS price $8.10

Stellite Div., Union Carbide Corp., Kokomo, Ind.
PROCESS IMPROVEMENT OF COLUMBIUM (Cb-752) ALLOY.
Phase II Interim engineering progress rept.,
1 Dec 63-31 Mar 64,
by J. G. Bewley and M. Schussler. 31 Mar 64, 86p.
Contract AF33 657 11210, Proj. 7 9760
Unclassified report

Descriptors: (*Niobium alloys, Rolling (Metallurgy)), (*Zirconium alloys, Ductility), (*Tungsten alloys, Recrystallization), Sheets, Rods, Thickness, Manufacturing methods, Processing, Metals, Control, Hardness, Metallography, Tensile properties, Creep, Rupture.

Approximately 800 pounds of Cb-752 alloy (columbium-10 percent tungsten-2.5 percent zirconium) 1/4-inch thick sheet bar were processed to 0.060-inch thickness, 30-inches width sheets. About 200 pounds of sheet in 0.060-, 0.030-, 0.018-, and 0.012-inch gages were produced from this material and furnished in the recrystallized condition. One large sheet was utilized to study the effects on alloy properties of a duplex annealing process. A total of 48 different processing cycles was investigated. A solution treatment at 2800 F, followed by 40 percent reduction by cold rolling, with a final anneal at 2400 F appears to produce the best combination of strength and ductility properties in Cb-752 alloy. This route will be used in the mill fabrication of the remainder of the 0.060-inch thick material to the final sheet gages of 0.030-, 0.018-, 0.012-, and 0.008-inch. (Author)

AD-600 404 Div. 17
OTS price $1.00

Army Materials Research Agency, Watertown, Mass.
MECHANICAL PROPERTIES OF COLD-DRAWN MARTENSITIC SAE 4340 STEEL ROD.
Technical rept.,
by Eugene Di Cesare. Jan 64, 34p.
Proj. 1A024401A110
AMRA TR64 02 Unclassified report

Descriptors: (*Steel, Rods), (*Martensite, Mechanical properties), Cold-working, Drawing (Machine processing), Tests, Hardness, Deformation, Heat treatment, Aging (Materials), Ductility, Stresses, Load distribution.

In the cold drawing of steel rods, the processing conditions can have an appreciable effect on the mechanical properties. Processing variables were prior heat treatment, consisting of a quench and temper at 1150 F, 1000 F, 800 F, 500 F, or room temperature; reduction (10 to 40 percent); back pull (0 to 16,650 lb); drawing speed (10 to 40 feet per minute); and aging temperature (room or 400 F). Final rod diameter was 0.409 inch. Engineering tensile, notch tensile, hardness, and true stress-true strain properties are presented. The maximum increase in engineering tensile and yield strengths was realized in the material pretempered at room temperature, drawn 10 percent and aged at 400 F. Yield and tensile strengths were increased from 222,000 psi to 368,000 psi and from 316,000 psi to 371,000 psi, respectively, with improved ductility. The primary effect of cold drawing, to strengthen by strain hardening, is dependent upon the pretempering temperature. An additional strengthening increment is due to aging at 400 F and appears to be essentially independent of the pretempering temperatures. Incomplete strain hardening based on the tensile stress-strain curve, appearances of a sharp yield point and/or yield point drop for some processing conditions, and effects of the Bridgman correction on the flow curves were observed and are discussed. (Author)

AD-600 427 Div. 17
OTS price $2.75

Defense Metals Information Center, Columbus, Ohio.
THE MECHANICAL PROPERTIES OF THE 18 PER CENT NICKEL MARAGING STEELS,
by J. E. Campbell, F. J. Barone, and D. P. Moon.
24 Feb 64, 128p. DMIC198
Contract AF33 615 1121, Proj. 8975
Unclassified report

Descriptors: (*Maraging steel, Mechanical properties), (*Nickel alloys, Aging (Materials)), Hardening, Cold-working, Tensile properties, Compressive properties, Fatigue (Mechanics), Creep, Rupture, Heat treatment, Toughness, Rocket cases, Pressure vessels, Forging, Welding.

Since the combination of tensile properties and toughness that can be obtained with the maraging steels is higher than can be achieved with other steels by simple heat treatments, there is considerable interest in using the maraging steels for critical components such as rocket motor cases, pressure vessels, and aircraft forgings. This report includes information on the tensile, compressive, shear, bearing, dynamic modulus,

and fracture toughness characteristics are compared at two strength levels (200-220 ksi and 260-280 ksi). Particular emphasis was placed on transverse mechanical properties. Susceptibilities to hydrogen embrittlement of the variously different processed materials are also compared. In general, the data indicate that vacuum melting offers a significant improvement in mechanical properties over air-melted steel in the transverse grain direction. In particular, the fracture toughness, impact strength, fatigue, ductility and resistance to hydrogen embrittlement are significantly enhanced by the vacuum melting process. (Author)

AD-600 762 Div. 17
OTS price $4.00

Nuclear Metals, Inc., Concord, Mass.
REFRACTORY METAL CONSTITUTION DIAGRAMS.
Rept. for Jan 62-Sep 63,
by V. Nerses, E. J. Rapperport, J. L. Klein, L. F. Pease and S. J. Michalik. Jan 64, 300p.
Contract AF33 616 7157, Proj. 7351, Task 735101
WADD TR60 132 P3 Unclassified report

Descriptors: (*Refractory metal alloys), Molybdenum alloys, Titanium alloys, Zirconium alloys, Tungsten alloys, Palladium alloys, Iridium alloys, Niobium alloys, Ruthenium alloys, Tantalum alloys, Rhodium alloys, Hafnium alloys, Osmium alloys, Rhenium alloys, Phase studies.

Data on six binary constitution diagrams and four ternary constitution diagrams of some of the refractory metals are presented. The binary diagrams include Nb-Ru, Nb-Ir, Nb-Rh, Nb-Hf, Mo-Ir and W-Pd; the ternaries are Mo-Zr-Ti, Ta-W-Zr, W-Mo-Os and W-Re-Hf. The quaternary Mo-Zr-Ti-C in the molybdenum rich region at low carbon contents was superficially examined. (Author)

AD-600 764 Div. 17
OTS price $2.25

Battelle Memorial Inst., Columbus, Ohio.
FURTHER DEVELOPMENT OF A DUCTILE TUNGSTEN-BASE SHEET ALLOY.
Summary rept., 3 Feb 63-3 Apr 64,
by J. L. Ratliff, D. J. Maykuth, H. R. Ogden and R. I. Jaffee. 30 Apr 64, 81p.
Contract N600 19 59738, continuation of Contract NOw61 0677c
Unclassified report

Descriptors: (*Tungsten alloys, Ductility), (*Sheets, Tungsten alloys), Rhenium alloys, Thorium compounds, Zirconium compounds, Oxides, Recrystallization, Tungsten, Powder alloys, Refractory metal alloys, Powder metallurgy, Transition temperature, Powder metals, Sintering, Grain structures (Metallurgy), Rolling (Metallurgy).

An experimental program was conducted with the primary objective of developing a room-temperature ductile tungsten-base alloy. The alloying approach employed was to study the combined effects of small additions of rhenium or iridium to tungsten for matrix softening and fine inert oxide dispersions of ThO2 or ZrO2. Also, the effect of alkali-silicate doping additions to the matrix were studied as to their ability to control grain size and recrystallization behavior. Optimum property combinations were found for W-5Re-ThO2 type alloys prepared using a commercially doped tungsten powder. The culmination of this research was the development of a W-5Re-4ThO2 alloy which showed an ultimate strength of 193 ksi, a yield strength of 182 ksi, and a 6 per cent elongation in tension at room temperature. This alloy also showed a 1-hour recrystallization temperature of 2000 C and an ultimate tensile strength of 36.6 ksi at 1650 C (3000 F). (Author)

AD-600 784 Div. 17
OTS price $5.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
CORROSION AND PROTECTION OF METAL STRUCTURAL MATERIALS,
ed. by N. D. Tomashov. 20 Mar 64, 362p.
FTD TT63 672 Unclassified report

Trans. of mono. Korroziya i Zashchita Konstruktsionnykh Metallicheskikh Materialov: Sbornik Statei, Moscow, 1961, pp. 5-260.

Descriptors: (*Metals, Corrosion), (*Corrosion inhibition, Alloys), Acids, Titanium, Nickel alloys, Titanium alloys, Tantalum alloys, Stainless steel, Fatigue (Mechanics), Coatings, Steel, USSR.

The expediency of utilizing the concept of a controlling factor for the characteristics of a protective-action mechanism and a systematization of various types of anticorrosion protection is considered in the first article of the collection. The remaining papers of the collection are devoted to specific problems encountered in experimental study of the corrosion processes and the protection of metallic systems. Such important divisions as the study of gas corrosion during heat-treatment of alloys, the corrosion and protection of metals during etching in acids, the acid resistance of metals at elevated temperatures, the corrosion of new metallic structural materials -- titanium, its alloys and niobium alloys containing tantalum -- and new studies to determine the intergranular corrosion of stainless steels are reflected in this collection. Recent investigations linked with study of the corrosion fatigue of steel and with the corrosion and protection in certain operations of the chemical industry are also incorporated in the collection. (Author)

AD-600 790 Div. 17
OTS price $3.60

United States Steel Corp., Monroeville, Pa.
THE EFFECT OF COBALT ON THE STRENGTH AND TOUGHNESS OF Ni-Cr-Mo HIGH-YIELD-STRENGTH STEELS.
Technical rept.,
by A. J. Birkle and L. F. Porter. 1 Apr 64, 33p.
Contract NObs88540, Proj. SS050 000, Task 1567
Unclassified report

Descriptors: (*Steel, Strength), (*Toughness, Steel), (*Cobalt, Metallurgy), Quenching (Cooling), Heat treatment, Nickel, Chromium, Molybdenum, Mechanical properties, Metallography, Welding, Feasibility studies.

Quenched and tempered steels also hold promise as base metals for an HY-180/210 weldment. Therefore, a program was initiated to evaluate quenched and tempered steels for this application. The effect of varying cobalt content from 0 to 8 percent on the strength and toughness of 5Ni-1.5Cr-0.5Mo steels containing either 0.18 or 0.25 percent carbon was determined. Studies on 1/2-inch-thick water-quenched plates showed that all the steels exhibited optimum toughness at high yield strengths when tempered at 400 F. Steels without cobalt and a steel containing 0.23 percent carbon and 8.04 percent cobalt had the best notch toughness at yield strengths in the range 170 to 210 ksi. The toughness of these

using aerated and deaerated solutions of 1N and pH1 sulfuric acid by galvanostatic and potentiostatic methods. (Author)

AD-600 579 Div. 17
OTS price $2.00

Rocketdyne, Canoga Park, Calif.
STRENGTHENING IRON-BASE ALLOYS BY SHOCK WAVES.
Quarterly progress rept., 16 Jan-15 Apr 64,
by B. G. Koepke and R. P. Jewett. 15 Apr 64, 77p.
Rocketdyne R5413 3
Contract AF33 657 11250
Unclassified report

Descriptors: (*Iron alloys, Mechanical properties), (*Shock waves, Steel), Steel, Stainless steel, Tensile properties, Aging (Materials), Grain structures (Metallurgy).

Shock loading of all materials at 157 and 270 kilobars was completed. Hardness measurements were completed on all materials, including solution-treated, shocked, and aged A-286 steel. Aging of shock-loaded A-286 steel resulted in higher maximum aged hardness, and peak hardness was reached in shorter times. Transmission microscopy of the plain carbon and alloy structural steels was completed. Results showed that the amount of strengthening was associated with a dislocation density increase in the free ferrite. The relative amount of strengthening was found to be a function of the amount of free ferrite present. (Author)

AD-600 597 Div. 17
OTS price $2.50

Aeroprojects, Inc., West Chester, Pa.
DEVELOPMENT OF ULTRASONIC WELDING WITH EMPHASIS ON PRODUCING HERMETIC SEALS.
Final summary rept.,
by J. Byron Jones, Nicholas Maropis, John G. Thomas and William N. Rosenberg. Sep 63, 106p.
AEROPROJ RR61 99
Contract DA36 034ORD3254
Unclassified report

Descriptors: (*Seals (Stoppers), Welding), (*Welding, Ultrasonic radiation), Production, Ultrasonic radiation, Welds, Feasibility studies, Metallography, X-ray diffraction analysis.

Uniformly reproducible ultrasonic ring and continuous-seam welds of hermetic-seal quality were produced in several alloys of different gages and in various geometries. The delineation of problems relating to high power delivery in a torsional system indicates that specifications for a ring-type welding unit with a 5-kilowatt power-handling capacity, and capable of welding heavy-gage structural aluminum sheet can result. Continuous-seam welds at speeds in excess of one foot/minute were produced in 0.040- and 0.064-inch 2014-T6 aluminum alloy, with and without inter-leaf, using a 5-kilowatt welding unit. Weld strengths achieved were up to 95 percent of parent metal strength. Modification can be made to the ultrasonic continuous-seam unit to handle up to 10 kilowatts in continuous operation, producing welds at reasonable rates in 0.080-inch sheet. Theoretical and experimental studies delineated impedance-matching requirements for optimum coupling of the ultrasonic energy to the weldment materials. (Author)

AD-600 643 Div. 17
OTS price $.75

Prevention of Deterioration Center, NAS-NRC, Washington, D. C.
BIBLIOGRAPHY ON VAPOR PHASE CORROSION INHIBITORS FOR NONFERROUS AND FERROUS METALS,
comp. by Hans Janecka. 4 Nov 63, 22p. PDC S63 046, PDL49679
Unclassified report

Descriptors: (*Corrosion inhibition, Metals), (*Bibliographies, Antioxidants), (*Antioxidants, Vapors), (*Corrosion inhibition, Bibliographies), Iron alloys, Steel.

AD-600 688 Div. 17
OTS price $.75

Redstone Scientific Information Center, Redstone Arsenal, Ala.
DEVELOPMENT OF A HIGH-STRENGTH STRESS-CORROSION-RESISTANT ALLOY WITH AN AlZnMg BASE. PART II. INFLUENCE OF CHEMICAL COMPOSITION ON ARTIFICIAL AGE-HARDENING AND STRESS CORROSION OF HIGH-STRENGTH AlZnMgCu ALLOYS,
by W. Rosenkranz. 8 May 64, 24p.
RSIC 177; TT 64 11683
Unclassified report

Trans. of Aluminium (West Germany) 1963, v. 39, no. 12, p. 741-752.

Descriptors: (*Corrosion-resistant alloys, Hardening), Aluminum alloys, Zinc alloys, Magnesium alloys, Copper alloys, Corrosion, Tensile properties, West Germany.

AD-600 695 Div. 17, 4
OTS price $.50

IIT Research Inst., Chicago, Ill.
EMBRITTLEMENT OF METALS BY ORGANIC LIQUIDS.
Quarterly rept., 1 Mar-31 May 64,
by W. Rostoker. 1 Jun 64, 15p. IITRI B183B2 5
Contract DA110RD022 3108
Unclassified report

Descriptors: (*Steel, Brittleness), (*Brittleness, Chlorides), (*Carboxylic acids, Steel), Fracture (Mechanics), Failure (Mechanics), Fatigue (Mechanics), Metalorganic compounds, Liquids, Dipole moments, Molecular structure, Organic compounds.

By a test involving a combination of static and dynamic loading, the carboxylic acids are shown to be embrittling to high-strength steel to a degree proportionate to the carbon chain length. It is shown that nonpolar liquids are in general not embrittling but that the magnitude of the dipole moment is not a measure of embrittling propensity. Evidence indicates that under appropriate conditions, a -Cl group is potentially as embrittling as an -OH or a $-O^-$ group. (See also AD-427 068). (Author)

AD-600 727 Div. 17
OTS price $1.75

Aeronautical Materials Lab., Naval Air Engineering Center, Philadelphia, Pa.
EVALUATION OF AIR MELTED AND VACUUM MELTED AISI 4340 STEEL,
by William H. Golding. 21 May 64, 62p.
NAEC AML 1947 Unclassified report

Descriptors: (*Steel, Mechanical properties), (*Refining (Metallurgy), Steel), Hardness, Tensile properties, Fatigue (Mechanics), Fracture (Mechanics), Grain structures (Metallurgy), Hydrogen embrittlement, Toughness, Ductility.

The report compares the mechanical properties of air-melted versus three different types of vacuum-melted AISI 4340 steel. Cleanliness, hardenability, tensile, impact, fatigue properties

AD-600 795 Div. 17
OTS price $3.60

United States Steel Corp., Monroeville, Pa.
DROP-WEIGHT TESTS OF EXPERIMENTAL HY-130/150 STEELS.
Technical rept.,
by S. T. Rolfe. 1 Apr 64, 37p.
Contract NObs88540, Proj. SR007 01 01, Task 853
Unclassified report

Descriptors: (*Steel, Drop testing), (*Fracture (Mechanics), Steel), Mechanical properties, Test methods, Nickel, Chromium, Molybdenum, Vanadium, Welding, Metal plates, Toughness.

One of the most important requirements of HY-130/150 steels and weldments is high fracture toughness. For laboratory screening of experimental steels, fracture toughness can be most conveniently determined from Charpy V-notch impact tests. However, fracture-toughness values obtained from drop-weight and explosion-bulge tests are also important, and correlations between these tests and the Charpy V-notch test have not been established for steels having yield strengths in the range 130 to 150 ksi. Therefore, the Applied Research Laboratory conducted Charpy V-notch and drop-weight tests of 1/2- and 1-inch-thick plates of four experimental HY-130/150 steels (3 3/4Ni-Cr-Mo-V, 5 1/4Ni-Cr-Mo-V, 5Ni-Cr-Mo-V, and 7 1/2Ni-Cr-Mo steels) and HY-80 steel (heat-treated to a yield strength of 150 ksi) to determine the relation between Charpy V-notch and drop-weight test criteria and to determine the best method for obtaining fracture-toughness values to screen experimental HY-130/150 steels. The results indicated that for HY-130/150 type steels, the drop-weight test nil-ductility temperature (NDT) can be estimated from Charpy V-notch test data by determining the temperature corresponding to an energy absorption of about 40 ft-lb, a shear fracture of about 50 percent, or a lateral expansion of about 20 mils. (Author)

AD-600 803 Div. 17
OTS price $1.25

Defense Metals Information Center, Columbus, Ohio.
DEFENSE METALS INFORMATION CENTER SELECTED ACCESSIONS, MAY 1964,
comp. by Mary F. Banks. May 64, 49p.
Contract AF33 615 1121, Proj. 8975
Unclassified report

Descriptors: (*Bibliographies, Metals), (*Alloys, Bibliographies), (*Refractory metals, Bibliographies), Refractory materials, Steel, Stainless steel, Mechanical properties, Composite materials, Tensile properties, Abstracts.

AD-600 814 Div. 17
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A PHENOMENON IN ALLOYS OPPOSITE TO AGING,
by G. I. Pogodin-Alekseev. 29 Apr 64, 8p.
FTD TT64 124, TT 64 11669
Unclassified report

Unedited rough draft trans. of Fizika Metallov i Metallovedenie (USSR), 15:5, pp. 793-795, 1963.

Descriptors: (*Brass, Aging (Materials)), (*Aging (Materials), Alloys), Hardening, Solid solutions, Grain structures (Metallurgy), Microstructure, Heat treatment, Cooling, Phase studies, USSR.

Two types of aging were distinguished: aging which is the decomposition of a supersaturated solution and aging which is the dissolution of the excess phases. (Author)

AD-600 846 Div. 17
OTS price $.50

Army Materials Research Agency, Watertown, Mass.
THE INFLUENCE OF SECTION SIZE ON THE MECHANICAL PROPERTIES AND FRACTURE TOUGHNESS OF 7075-T6 ALUMINUM, 6Al-6V-2Sn TITANIUM, AND AISI 4340 STEEL,
by Thomas S. DeSisto, Frank L. Carr and Frank R. Larson. Feb 64, 18p.
Proj. 1A010501B010
AMRA TR64 05 Unclassified report

Report on Basic Research in Physical Sciences.

Descriptors: (*Aluminum alloys, Mechanical properties), (*Steel, Mechanical properties), (*Titanium alloys, Mechanical properties), Fracture (Mechanics), Toughness, Tensile properties, Heat treatment, Chemical analysis.

The influence of section size on mechanical properties, yield strength, tensile strength, elongation, reduction of area, notched tensile ratios, and fracture toughness was determined for 7075-T6 aluminum, 6Al-6V-2Sn titanium, and AISI 4340 steel. The tests were made on smooth tension specimens with diameters from 0.113 to 3.57 inches, and sharply notched specimens with diameters from 0.160 to 5.05 inches. The tensile fracture topography of the smooth and notched specimens is illustrated and discussed. The data show that yield and tensile strengths are not changed appreciably by increasing section size, but ductility and toughness properties are affected. (Author)

AD-600 848 Div. 17
OTS price $1.50

Wales Univ., Cardiff.
INTERNAL FRACTION OF MARTENSITE.
Annual technical rept. no. 1,
by R. Rawlings and J. McGrath. 29 Feb 64, 55p.
Contract DA91 591EUC2834
Unclassified report

Descriptors: (*Martensite, Internal friction), (*Internal friction, Martensite), Steel, Metallography, Damping, Stresses, Carbon, Metallurgy, Tests, Phase studies.

A survey of the literature dealing with the internal friction of martensite was made. The internal friction peak at 250 - 270 C, generally accepted as being due to stress-induced movement of dislocations associated with carbon atoms or carbide particles, increases in height with carbon content. The rate of increase with carbon content decreases when the %C is more than about 0.6. Possible reasons for this are discussed - these include the increased proportion of austenite, the faster rate of tempering during the test and the possibility of saturation of the dislocations with the higher carbon contents. An inverted torsion pendulum using wire specimens 2.5in. long and 0.031 or 0.039in. dia., which may be either cooled below room temperature or heated either in vacuo or in a controlled atmosphere is described. Provision is made for the application of a d.c. magnetic field of about 250 oe. to the specimen in order to avoid magneto-elastic effects. These have been shown to be significant as shown by the decreased damping obtained by the use of a magnetic field. All testing was therefore carried out with a field which probably saturates the specimen magnetically. (Author)

AD-600 872 Div. 17
OTS price $1.00

Ling-Temco-Vought, Inc., Dallas, Tex.
DEVELOPMENT OF NICKEL BASE ALLOY SHEET FOR HIGH

steels approached that obtained in 1/2-inch-thick plates from production heats of 12Ni-5Cr-3Mo maraging steel. Except for the steels containing 8 percent cobalt, increasing cobalt content generally lowered toughness without markedly increasing strength. Raising the carbon content of the base steel from 0.19 to 0.26 percent resulted in an increase in yield strength from 170 to 189 ksi when the steel was tempered at 400 F. (Author)

AD-600 791 Div. 17
OTS price $2.60

United States Steel Corp., Monroeville, Pa.
A PRELIMINARY EVALUATION OF RAPID HEAT TREATMENT.
Technical rept.,
by R. P. Haak. 1 Apr 64, 28p.
Contract NObs88540, Proj. SS050 000, Task 1567
Unclassified report

Descriptors: (*Steel, Heat treatment), (*Heat treatment, Steel), Strength, Toughness, Nickel, Chromium, Molybdenum, Vanadium, Welding, Feasibility studies, Mechanical properties.

As part of the HY-180/210 feasibility study, various special processing techniques are being evaluated to establish their potential for improving the toughness of high-yield-strength steels. One processing technique that appears promising in this respect is rapid heat treatment. Therefore, the Applied Research Laboratory initiated a preliminary evaluation of the process by determining the mechanical properties of a 5 1/4 Ni-Cr-Mo-V steel that was heat treated by various combinations of rapid austenitizing, rapid tempering, conventional austenitizing, and conventional tempering. The results showed that the yield strength of the rapidly austenitized specimens was 10 to 20 ksi higher than that of the conventionally austenitized specimens with no loss of notch toughness or ductility. Rapid tempering (4 F per second) after rapid austenitizing produced a slightly better combination of strength and toughness at low tempering temperatures than conventional tempering, but conventional tempering produced a slightly better combination of strength and toughness at high tempering temperatures for rapidly austenitized specimens. These preliminary results indicate that rapid heat treatment offers considerable promise for increasing the yield strength of alloy steels by as much as 30 ksi with no loss in ductility or toughness. (Author)

AD-600 792 Div. 17, 26, 31
OTS price $4.60

United States Steel Corp., Monroeville, Pa.
FEASIBILITY OF DEVELOPING AN HY-180/210 WELDMENT.
Quarterly progress rept. no. 3,
by L. F. Porter, A. M. Rathbone, S. T. Rolfe and K. E. Dorschu. 1 Apr 64, 46p.
Contract NObs88540, Proj. SS050 000, Task 1567
Unclassified report

Descriptors: (*Steel, Mechanical properties), (*Submarine hulls, Steel), (*Welding, Feasibility studies), Maraging steels, Heat treatment, Metal plates, Submarine hulls, Martensite, Forging, Fracture (Mechanics).

Studies of the effects of composition and melting and processing practices on the properties of maraging steels have been continued and a final series of experiments to establish the potential of maraging steels as HY-180/210 base metals is now in progress. Carbon-martensite age-hardened steels continue to look promising and a statistical evaluation of their potential has been initiated. Significantly improved combinations of strength and toughness have been obtained in rapidly heat-treated conventional quenched and tempered steels, and this approach to developing an HY-180/210 base metal has been significantly expanded. Base-metal weldability studies indicate that the heat-affected-zone toughness of the 12Ni-5Cr-3Mo steel is not markedly lower than that of the base metal, but that the heat-affected zone is susceptible to cracking. Weld metals having yield strengths in the range 180 to 210 ksi have been developed, but much additional work is required to improve their toughness to the minimum level required for an HY-180/210 weldment. Development of special test procedures and construction of special equipment required to evaluate HY-180/210 steels and weldments have been completed, and tests are now being conducted on experimental HY-180/210 steels to obtain reference properties. (Author)

AD-600 793 Div. 17, 31
OTS price $4.60

United States Steel Corp., Monroeville, Pa.
BASE-METAL EVALUATION OF A PRODUCTION ELECTRIC-FURNACE HEAT OF 5Ni-Cr-Mo-V STEEL.
Technical rept.,
by S. J. Manganello and L. F. Porter. 1 Apr 64, 41p.
Contract NObs88540, Proj. SR007 01 01, Task 853
Unclassified report

Descriptors: (*Steel, Heat treatment), (*Submarine hulls, Steel), (*Metal plates, Mechanical properties), Rolling (Metallurgy), Quenching (Cooling), Austenite, Production, Tests, Toughness, Strength, Nickel, Chromium, Molybdenum, Vanadium.

An 80-ton electric-furnace heat of the 5Ni-Cr-Mo-V steel was melted, rolled to 1/2-, 1-, 2-, and 4-inch-thick plates, and the plates were quenched and tempered. An initial evaluation of the production and properties of the plates indicated that the 5Ni-Cr-Mo-V steel was satisfactory in all respects. Therefore, the production plates were more completely evaluated to determine the effect of various austenitizing and tempering treatments on their mechanical properties and to determine the uniformity of their mechanical properties. The heat-treating studies showed that the tempering characteristics of the production plates were similar to those of the Laboratory 5Ni-Cr-Mo-V steel, that blower-cooling 1/2-inch-thick plates to simulate the cooling at the midthickness of a 4-inch-thick water-quenched plate was a conservative simulation as previously reported, that the 5Ni-Cr-Mo-V steel has adequate hardenability for 4-inch-thick plates, and that the tensile and impact properties of heavy-gage 5Ni-Cr-Mo-V steel plates are slightly improved by a double- versus a single-austenitizing treatment. The studies of the uniformity of the production plates showed that the longitudinal and transverse tensile and impact properties of the 1/2- through 4-inch-thick production plates of the 5Ni-Cr-Mo-V steel were generally uniform. (Author)

AD-600 794 Div. 17, 26, 31
OTS price $2.60

United States Steel Corp., Monroeville, Pa.
HIGH-STRENGTH STEEL WELDMENTS FOR SUBMARINE HULLS.
Interim status rept.,
by J. H. Gross. 1 Apr 64, 30p.
Contract NObs88540, Proj. SR007 01 01, Task 853
Unclassified report

Descriptors: (*Steel, Mechanical properties), (*Welding, Steel), (*Submarine hulls, Steel), Feasibility studies, Economics.

Naval equipment, Maintenance, Data, Management control systems, Costs, Effectiveness, Abundance.

The Navy is currently attempting to develop an information system for maintenance and material management. A survey was conducted in order to obtain an initial estimate of information requirements for the many management actions performed throughout the Navy establishment. This paper describes the survey and its results. (Author)

AD-600 527 Div. 18, 32
OTS price $.75

RAND Corp., Santa Monica, Calif.
SOME IMPLICATIONS OF STRATEGIC CONCEPTS FOR WESTERN EUROPE NUCLEAR WEAPONS,
by A. E. Wessel. Apr 64, 23p. P2904
Unclassified report

Descriptors: (*Nuclear weapons, Military strategy), (*Military strategy, Western Europe), (*Western Europe, Military strategy), Political science, Cold war, Nuclear warfare, Foreign policy.

A nuclear strategic concept which completely rejects the use of Western European owned and controlled nuclear weapons as a supplement to U. S. military power is considered. Next, a kind of 'Force de Frappe' supplement of nuclear weapons is discussed. Finally, a rather special type of a very powerful and, perhaps ultimate, nuclear strategic concept is offered as food for thought. While there has been some significant public discussion of the first two concepts, the last one has some characteristics that have not been sufficiently explored. (Author)

AD-600 642 Div. 18, 14, 17
OTS price $.75

Prevention of Deterioration Center, NAS-NRC, Washington, D. C.
PRESERVATION OF INACTIVE EQUIPMENT AND LONG-TERM STORAGE OF MATERIALS,
comp. by Hans Janecka. 1 Nov 63, 26p. PDC S63 045, PDL49630
Unclassified report

Descriptors: (*Materials, Preservation), (*Bibliographies, Preservation), (*Storage, Materials), (*Preservation, Bibliographies), Preservation, Protective treatments, Corrosion inhibition, Logistics.

AD-600 759 Div. 18
OTS price $.50

Edison (Thomas A.) Research Labs., West Orange, N. J.
ENVIRONMENTAL INSTRUMENT PACKAGE FOR A CIVIL DEFENSE SHELTER.
Summary of research rept.
May 64, 6p.
Contract OCD OS62 216, Task 1232B
Unclassified report

Descriptors: (*Health physics instrumentation), (*Civil defense systems, Shelters), (*Instrumentation, Environmental tests), (*Environmental tests, Instrumentation), Air pollution, Radiological contamination, Hazards, Safety.

An instrument evaluation revealed deficiencies in every device of existing equipment. Recommended revisions to existing equipment relate to: (1) Instruction material, (2) shelf life, (3) air sampling, and (4) new instruments. These include: (1) Effective temperature indicator, (2) filament type hygrometer, (3) glass tube for oxygen, (4) carbon dioxide detector, and (5) exposure detectors. (Author)

19. NAVIGATION

AD-600 041 Div. 19, 30
OTS price $2.25

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
GYROSCOPIC EFFECT, ITS PHENOMENA AND APPLICATION (SELECTED CHAPTERS),
by V. A. Pavlov. 29 Jan 64, 81p.
FTD TT63 837; TT 64 11639
Unclassified report

Unedited rough draft translation of mono. Giroskopicheskii Effekt, Ego Proyavleniya i Ispol'zovanie, Leningrad, 1961, pp. 52-75, 118-147. (Chaps. 4, 7-8)

Descriptors: (*Gyroscopes, Instrumentation), Navigation, Ships, Mining engineering, Ordnance, USSR, Gyro compasses.

The use of the gyrocompass for naval navigational purposes is examined. The design and operation of the Foucault gyrocompass, along with a practical model of a gyrocompass is presented. Gyroscopic steering instruments and ship's stabilizers are discussed. The use of gyroscopes in mining engineering is examined, with particular attention given to a gyroscopic stabilizer of a magnetometer and a mine surveyor's gyrocompass. Finally, the use of the gyroscope for military purposes is studied.

AD-600 107 Div. 19, 8
OTS price $3.00

Sierra Research Corp., Buffalo, N. Y.
HIGH-ACCURACY FREQUENCY STANDARDS IN AERIAL NAVIGATION.
Final rept.,
by Roger B. Russell, Jr. and John P. Chisholm.
July 63, 153p. Sierra TR0373
Contract FA WA4222, Proj. 116 8 8D
Unclassified report

Descriptors: (*Radio navigation, Airborne), (*Loran, Navigation aids), (*Radar equipment, High frequency), Standards, Analog computers, Clocks, Display systems, Low frequency, Hyperbolic navigation, Atomic clocks, Very low frequency.

A study program was undertaken to determine the desirability and utility of the application of precise clocks (or frequency standards) to aircraft positioning measuring systems (or navigation systems). The study included an investigation of both atomic and crystal frequency standards with regard to their performance relative to this application. It also included the study of long-range navigation systems and their airborne equipment. Systems studied were Loran C and various VLF systems, mainly OMEGA. Some effort also was put into a VHF terminal navigation concept that could be considered a long-range ILS or sectored TACAN. The concept of improved displays and of a simple analog computer for use with a rho-rho precise clocked Loran C system was also studied. A full system design utilizing the equipment studied under this program was not prepared, although detailed

TEMPERATURE APPLICATION. MECHANICAL PROPERTIES OF INCO 713c SHEET.
Rept. for 1 Jun 63-28 Feb 64,
by D. F. Duff and P. D. Watson. Apr 64, 34p.
Contract AF33 657 11160, Proj. 7351, Task 735105
ASD TDR62 869 Unclassified report

Descriptors: (*Nickel alloys, Sheets), (*Sheets, Nickel alloys), Mechanical properties, Heat-resistant metals and alloys, High temperature research, Stresses, Rolling (Metallurgy), Heat treatment, Ductility, Chemical analysis, Metallography.

The elevated temperature tensile and stress-rupture properties of Inco 713c sheet fabricated by the basic process described in ASD-TDR-62-869 (AD-406 873) under closely controlled test conditions were measured. Tensile tests at 1900 and 1700 F and stress-rupture tests at 1800 and 1700 F were conducted on both Inco 713c specimens and Rene' 41 control specimens by an independent test agency, Metcut Research Associates of Cincinnati, Ohio. The results of the tests confirmed that Inco 713c sheet had much higher tensile and stress-rupture strengths than Rene' 41 at the selected test temperatures but the ductility of the Inco 713c sheet was found to be below normally accepted values for sheet alloys. A limited program was then conducted to demonstrate the feasibility of improving the ductility by minor modifications in the rolling and heat treating procedures. (Author)

18. MILITARY SCIENCES AND OPERATIONS

AD-600 065 Div. 18
OTS price $2.00

Gautney and Jones, Washington, D. C.
STUDY AND DEVELOPMENT OF SPECIFICATIONS FOR PROTOTYPE TRANSMITTERS AND RECEIVERS FOR FALLOUT SHELTER COMMUNICATIONS SYSTEMS.
Final rept.
May 64, 71p. Rept. no. TGGM642
Contract OCD PS64 8
Unclassified report

Descriptors: (*Shelters, Communication systems), (*Communication systems, Shelters), Civil defense systems, Transmitter-receivers, Radio equipment, Costs, Specifications.

A study approach to the problem of developing specifications for equipment for a radio backup to a landline fallout shelter communications system is described. Consideration is given those aspects of shelter program which contribute requirements for electrical performance of the equipments. Discussions are included concerning frequency availability and usage, cost analysis, state of the art, and recommendations. The report includes full specifications for three types of radio equipment. A radio backup to a landline communications system was found to be technically feasible. A substantial savings in costs relative to that of presently available commercial radio equipment can be realized. (Author)

AD-600 081 Div. 18
OTS price $2.50

RAND Corp., Santa Monica, Calif.
NOTES ON THE SECOND EDITION OF MARSHAL V. D. SOKOLOVSKII'S ''MILITARY STRATEGY'',
by Leon Goure. Feb 64, 106p. RAND RM3972PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Military strategy, USSR), (*Military strategy, Reviews), Military tactics, Reports, Warfare, Armed forces (Foreign), Defense systems, Armed forces operations.

The second edition of 'Military Strategy' by Marshal Sokolvskii and others, published in October 1963, contains about fifty pages of new material and numerous changes in the original text. Some of these changes are intended to update the account of Western military postures, to take account of recent world events, or to incorporate the lessons of speeches and publications by Soviet leaders. Others reflect developments in technology, improvements in military capability, or greater realism in considering the problems of war. Domestic and foreign criticism of the first edition evidently has led to a number of revisions. Finally, a few changes may be interpreted as the result of doctrinal developments. It is difficult to say how far any of these revisions were made for the purpose of influencing Western opinion. (Author)

AD-600 239 Div. 18, 15
OTS price $1.75

RAND Corp., Santa Monica, Calif.
AN EMPIRICAL TEST OF EXPONENTIAL SMOOTHING,
by Max Astrachan and Craig C. Sherbrooke. Mar 64, 61p. RM3938PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Mathematical prediction, Stock level control), (*Spare parts, Mathematical prediction), Inventory control, Logistics, Air force equipment, Statistical tests.

This Memorandum, a comparative study of techniques for predicting the demand for spare parts, attempted to discover the potential advantages which exponential smoothing has over the moving average procedures the Air Force is now using. Various forms of exponential smoothing and averaging were applied to three sample sets of data: Hi-Valu and Category II recoverable B-52 parts, components of the Falcon missile, and Category III depot issues of B-52 items. The study led to the following findings and conclusions: (1) For any of the three sets of data, exponential smoothing was not a significantly better prediction technique than the cumulative issue rate procedures now being used in the Air Force. Nevertheless, it does have definite computational advantages which may be valuable. (2) A measure of aggregate loss, such as the loss function introduced in this study, should be used to select preferred smoothing techniques. (3) The use of program element information for the Falcon components improved the accuracy of our predictions; application of requisition data, which was available for the Category III items, did not. (4) With any of the techniques applied to the Category III items, prediction accuracy did not increase substantially when the base period was made longer than one year. (Author)

AD-600 450 Div. 18
OTS price $3.50

George Washington Univ., Washington, D. C.
A SURVEY OF INFORMATION REQUIREMENTS FOR NAVY MAINTENANCE AND MATERIAL MANAGEMENT.
15 Apr 64, 207p. GWU T170
Contracts Nonr76103, Nonr76105, Projs. NR345 107, NR047 001
Unclassified report

Descriptors: (*Logistics, Management control systems), (*Material control, Naval equipment).

The report presents the engineering results of the REGAL test evaluation program. The basic objective of the program was to determine the feasibility of the REGAL system, using an interferometer antenna, to provide airborne derived elevation angle and range data capable of providing accurate guidance for the purpose of landing aircraft. Comprehensive static and dynamic testing has revealed that REGAL has an elevation accuracy of 0.03 degrees for all angles 0.25 degrees above the mean ground plane and that the range techniques present the ability to approach within ±50 feet or 1%, whichever is greater, of the actual range. The latter part of the program was used to determine how well REGAL actually performed in a landing system. Over two hundred completely automatic landings were achieved using four different type aircraft, all equipped with different type landing computers and autopilots. (Author)

block diagrams of all important subsystem components are presented. The general subject studied proved to expand in scope greater than was initially contemplated. (Author)

AD-600 140 Div. 19
OTS price $.75

Institute of Science and Tech., Univ. of Michigan, Ann Arbor.
A SETTLING TIME CONSTRAINED OPTIMIZATION OF A VELOCITY INERTIAL NAVIGATION SYSTEM,
by W. A. Porter and M. Kuo. May 64, 22p. IST2900 464R
Contract DA36 039sc78801
Unclassified report

Report on Project MICHIGAN.

Descriptors: (*Doppler navigation, Optimization), (*Inertial navigation, Optimization), Navigation, Doppler systems, Instrumentation, Performance, Transients, Differential equations.

A technique is described for improving transient performance in the velocity inertial system while minimizing the standard deviation of the system error (for example, the standard deviation of the system velocity measurement error). To accomplish this, a prescribed settling time constraint is formulated for the system response, and the constraint equation is then imposed on the minimization process. The result shows that considerable settling time improvement can be derived without sacrificing system accuracy. (Author)

AD-600 141 Div. 19, 15
OTS price $.50

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
IMPROVEMENT OF SENSOR RESPONSE BY AN ANALOG TECHNIQUE,
by Heinz H. Grote. Mar 64, 17p.
Task DA1A011001B021 02
AELRDL TR2445 Unclassified report

Descriptors: (*Navigation, Analog systems), Differential equations, Thermocouples, Thermometers, Instrumentation.

After defining a sensor, it is shown that sensors can frequently be described by linear differential equations. This allows a simple restoration of the input from the measured output. As an example, a thermocouple-thermometer is investigated. Results and limitations of the presented restoration technique are treated. (Author)

AD-600 570 Div. 19, 8, 25
OTS price $6.60

Motorola, Inc., Riverside, Calif.
FUNDAMENTAL SENSOR STUDY.
Quarterly progress rept. no. 1, Sep-Nov 58,
by E. E. Dodd, O. W. Fabian, T. E. Hartman and A. R. Shapiro. Jan 59, 62p. RLQ3846 1
Contract Nonr167000
Unclassified report

Descriptors: (*Inertial navigation, Instrumentation), (*Instrumentation, Classification), (*Quantum mechanics), Mechanics, Electron beams, Particle beams, Dielectric properties.

The prime purpose of this study was to develop a system of classification for inertial navigation sensors that will aid in the prediction of performance. During this quarter a generic model for this class of instruments was defined and a set of differentiating principles chosen for the classification. These are: the equation of motion; measurement and constraint technique; and material of construction. A method of classification based upon these differentia is described. The classification by means of the equation of motion is developed in detail. In addition the results of a study of an electron beam accelerometer and a survey of dielectric theory are reported. It is contemplated that these results will be used in developing the lower orders of the classification system. (Author)

AD-600 571 Div. 19, 8, 25
OTS price $13.00

Motorola, Inc., Riverside, Calif.
FUNDAMENTAL SENSOR STUDY.
Quarterly progress rept. no. 2, Dec 58-Feb 59,
by E. E. Dodd, O. W. Fabian, T. E. Hartman and A. R. Shapiro. May 59, 182p. RLQ3846 2
Contract Nonr167000
Unclassified report

Descriptors: (*Inertial navigation, Instrumentation), (*Instrumentation, Classification), (*Quantum mechanics), Design, Performance (Engineering), Particle beams, Electrons, Accelerometers, Mechanics.

The prime purpose of this study was to develop a system of classification of inertial navigation sensors that will aid in the prediction of performance. During this quarter, the system previously developed was tested by means of a quantum mechanical and a classical model. A study of the problem of classification and performance criteria for all sensors is described. An improved classification system for inertial navigation sensors is presented. The new scheme groups known theoretical physical systems by means of analytical constructs from which it is possible to derive design information and to predict performance for real sensors. In addition the results of our model studies provide quantitative limits on the precision achievable from inertial navigation sensors employing bound-electron and discrete particle beam phenomena. (See also AD-600 570) (Author)

AD-600 572 Div. 19, 1, 8
OTS price $.75

Army Aviation Test Board, Fort Rucker, Ala.
SERVICE TEST OF THE AN/TRN-9(XC-2) RADIO BEACON.
Revised rept. of test,
by Rush R. Wicker, Jr. 17 Apr 64, 30p.
Proj. 4 3 3350 02
Unclassified report

Descriptors: (*Radio beacons, Tests), Radio navigation, Radio equipment, Remote control, Monitors, Radio transmitters, Antennas.

AD-600 826 Div. 19, 1
OTS price $9.10

ITT Gilfillan, Inc., Los Angeles, Calif.
REGAL TEST PROGRAM SUPPORT.
Final rept., Mar 60-June 63.
22 Apr 64, 108p.
Contract FAA BRD245
Unclassified report

Descriptors: (*Air traffic control systems, Airplane landings), (*Position finding, Flight instruments), (*Approach indicators, Flight testing), (*All-weather aviation, Airplane landings), Flight instruments, Landings, Reliability, Flight testing, Antennas, Radio interferometers.

Final rept., Apr 60-Mar 61,
by J. H. Simpson. Apr 64, 91p. GPLI A22 2
Contract AF33 616 5715, Proj. 4431, Task 50758
ASD TDR63 786 Unclassified report

Descriptors: (*Gyroscopes, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Oscillators), Optical equipment, Pumping (Electronics), Design, Operation.

A review of the principles of the operation of the nuclear gyroscope is given. A detailed study of the low-field optical resonance techniques for orienting a collection of atomic nuclei and for monitoring the motion of the resultant magnetization led to the abandonment of the conventional high-field NMR techniques for constructing NMR controlled feedback oscillators. A theoretical estimate of the accuracy of a nuclear gyroscope using optical techniques is made for a particular configuration which is found to have a high level of accuracy. Details of a laboratory test model are given. A method for making the gyro self calibrating is treated in Appendix I. Appendix II is a survey of optical pumping techniques. (Author)

AD-600 172 Div. 20
OTS price $.50

Naval Radiological Defense Lab., San Francisco, Calif.
DECAY CHARACTERISTICS OF SR93,
by V. Akamian. 9 Mar 64, 16p.
NRDL TR733 Unclassified report

Descriptors: (*Strontium, Radioactive decay), (*Radioactive decay, Strontium), (*Strontium, Half life), (*Fission product activity, Strontium), Gamma rays, Gamma-ray spectroscopy, Beta-ray spectroscopy, Scintillation counters, Fission products, Nuclear energy, Yttrium.

The decay characteristics of Sr93 were examined by gamma-ray scintillation spectrometry and beta-ray proportional counting. A 7.8-min half-life was derived from the beta-ray decay data in agreement with literature values. The gamma-ray spectra yielded a 7.6 ± 0.2-min half-life associated with the four most abundant gamma rays. The gamma-ray energies associated with Sr93 in the 0 to 2.56-Mev range are: 0.174, 0.257, 0.341, 0.451, 0.590, 0.717, 0.886, 1.02, 1.06, 1.09, 1.21, 1.66, 2.13, 2.18, and 2.46 Mev. The relative abundance of the prominent gamma rays are 0.174(30), 0.257(13), 0.590(83), 0.717(31), and 0.886 Mev (100). Evidence of the possible existence of Y93m was noted. (Author)

AD-600 253 Div. 20, 8
OTS price $1.50

Hughes Research Labs., Malibu, Calif.
RESEARCH INVESTIGATION OF p-i-n- ELECTRON JUNCTION DETECTORS.
Summary engineering rept., 11 Feb 63-11 Apr 64.
May 64, 54p.
Contract NObsr89169
Unclassified report

Descriptors: (*Diodes (Semiconductor), Radiation measurement systems), (*Radiation measurement systems, Diodes (Semiconductor)), Detectors, Count-rate meters, Electrometers, Beta particles, Silicon, Lithium, Styrene plastics, Dose rate, Thallium, Phosphorus, Sulfur, Radioactive isotopes, Military requirements.

Various types of radioactive sources containing the isotopes thallium-204, phosphorous-32, and sulfur-35 have been utilized in carefully specified geometries for the purpose of comparing the response of silicon lithium-drifted p-i-n junction of detectors with extrapolation chamber measurements of the surface absorbed dose rate in polystyrene. Specifically, data has been obtained showing the ratio of detector response (open-circuit voltage or count rate) to surface absorbed dose rate in polystyrene as a function of distance from the source for various source and detector areas for both thick and thin sources. 'Infinitely thick' solutions of thallium-204 and phosphorous-32 having circular areas of 1.04, 10.0, and 100 sq cm and 'thin' dry (7.6 sq cm area) sources of all three isotopes were used. Detector open-circuit voltage measurements were made for all these source configurations using a number of moderately thin window p-i-n junction detectors having areas of 0.04, 0.24, 1.0, and 11.9 sq cm. One of these detectors (0.24 sq cm) has been used for count rate measurements with all of the thick source configurations. The large (11.9 sq cm) detector was used only with the 10.0-sq cm-thick phosphorous-32 source. Further measurements are now in progress. For all of the detector and source configurations studied, the response of the p-i-n detectors relative to absorbed dose rate increased with distance between source and detector. (Author)

AD-600 270 Div. 20, 8
OTS price $6.60

Westinghouse Defense and Space Center, Baltimore, Md.
FEASIBILITY STUDY OF EM GENERATOR.
Final technical documentary rept., Nov 62-Dec 63,
by S. L. Ruby. Dec 63, 65p. Westing487A2
Contract AF33 657 9588, Proj. 5237, Task 523701
RTD TDR63 4168 Unclassified report

Descriptors: (*Electromagnetic waves, Generators), (*Gamma emission, Sources), (*Nuclear physics, Gamma emission), Gamma rays, Resonance absorption, Isomeric transitions, Feasibility studies, Lasers.

In hopes of achieving laser-like action for gamma radiation, the stimulated emission of gamma rays, a prerequisite but easier task, was studied. Studies indicate that although there is no theoretical difficulty, even the mere demonstration of this effect in actual cases lies beyond present capabilities. In support of this conclusion, two experiments will be discussed. Both use nuclear absorption, rather than the theoretically almost identical stimulated emission process. The first experiment which was performed as part of this contract shows that the ''lifetime'' of a nuclear state depends on the entire system in which the nucleus is placed. The second experiment, performed in Russia and reported in the U. S. in early September 1963 demonstrated that the nuclear resonance absorption process can just be barely detected in a nucleus whose half-life is 63 seconds. As anticipated, the probability for this process is decreased by various line broadening mechanisms approximately six orders of magnitude below simple expectations. The observed effect is barely above statistical fluctuations. In conclusion: (1) In the best possible case, nuclear lifetime lengthening due to absorption can be barely observed, (2) Nuclear lifetime shortening-stimulated emission is more difficult to observe by a factor of at least 10 to the 7th power. (Author)

AD-600 297 Div. 20
OTS price $1.00

Nuclear-Chicago Corp., Des Plaines, Ill.
DEVELOPMENT ENGINEERING OF CD V-797 CALIBRATOR.

20. NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

AD-600 054 Div. 20, 8, 21
OTS price $2.25

North American Aviation, Inc., Downey, Calif.
STUDY TO REDUCE AND COMPILE USAF NAP RADIATION EFFECTS DATA.
Final rept., 10 June 63-23 Mar 64,
by E. R. Beever. Apr 64, 91p. Rept. no. SID64 3
Contract AF29 601 5910, Proj. 1831, Task 183108
WL TDR64 1 Unclassified report

Descriptors: (*Electronic equipment, Radiation damage), (*Data processing systems, Punched cards), Environmental tests, Documentation, Data storage systems, Nuclear propulsion, Space propulsion, Neutron flux.

Irradiation tests were performed on 2300 electronic piece parts to determine the effects of reactor-produced radiation on their operational characteristics. The irradiations were performed in a lithium hydride modified reactor environment to integrated motion fluxes greater than 10 to the 13th power n/sq cm (E>0.1 Mev) and gamma doses in excess of 2 x 10 to the 7th power Rad (C). The vast amount of data generated in this test was reduced to approximately six pertinent data points and recorded on computer library file cards along with information such as piece part application, manufacturer, manufacturing process, etc., concerning each electronic piece part. (Author)

AD-600 057 Div. 20
OTS price $.50

Ballistic Research Labs., Aberdeen Proving Ground, Md.
THE USE OF THE HELIUM 3 SPECTROMETER IN NEUTRON ATTENUATION MEASUREMENTS.
Memo. rept.,
by A. Manning, T. Jeter, H. Schuckler and W. Slack. Feb 64, 9p.
Proj. 1A022601A086
BRL MR1545 Unclassified report

Descriptors: (*Radiation measurement systems, Semiconductor devices), (*Nuclear radiation spectrometers, Neutron spectrum), (*Neutrons, Attenuation), Semiconductors, Silicon, Helium, Neutron reactions, Measurement.

The helium 3 sandwich-type spectrometer has proved to be an extremely good detector for making neutron spectra and attenuation measurements. A method of procedure is outlined to demonstrate how neutron relaxation lengths can be measured easily and how this technique can be applied to other neutron measurement problems. (Author)

AD-600 090 Div. 20
OTS price $2.75

Edison (Thomas A.) Industries, West Orange, N. J.
DEVELOPMENT OF A LOW COST GAMMA RADIATION SURVEY METER.
Final rept.,
by L. G. Figular. 1 Mar 64, 127p. EDISON IND
Contract OCD PS64 13, Proj. 2134B
Unclassified report

Descriptors: (*Radiation measurement systems, Gamma counters), (*Gamma counters, Semiconductor devices), Health physics instrumentation, Design, Environmental tests, Photoelectric effect, Circuits, Industrial production, Costs, Specifications.

The report covers the investigation and development of a new low-cost gamma radiation survey meter with a range of 1 to 100 Roentgens per hour. A survey of existing gamma radiation detection transducers is presented with special emphasis on comparing newer semiconductor types with the Edison radiation detection type. Theory of operation and characteristics of the Edison radiation detector are given as well as results of preliminary gamma irradiation tests. Prototype design and testing is described and test results for the final prototype are given. A preliminary specification covering the new survey meter is presented to cover the design and testing requirements of a production instrument. Finally, recommendations are made which may result in improvement of the detection tube and reduce the cost of the meter still further. (Author)

AD-600 135 Div. 20, 16
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
MEASUREMENT OF NEUTRON TISSUE DOSE BEHIND REACTOR SHIELDING,
by B. Keirim-Markus, V. T. Korneev, V. V. Markelov and L. N. Uspenskii. 31 Mar 64, 17p.
FTD TT63 1047; TT 64 11649
Unclassified report

Unedited rough draft trans. of mono Sympozium po Biologicheskomy Vozdeistviyu Neitronnykh Obluchenii, 7-11 Oct 63. Paper no. SM-44/56, 16p.

Descriptors: (*Health physics instrumentation, Dosimeters), (*Dosimeters, Neutron spectrum), (*Neutrons, Radiological dosage), Thermal neutrons, Fast neutrons, Neutron flux, Neutron counters, Scintillation counters, Shielding, Tissues (Biology), USSR.

The basic features of the RUS-series dosimeters are described and a method is given for their use in the analysis of the composition of neutron radiation with regard to the dose contribution of thermal, intermediate, and fast neutrons. (Author)

AD-600 143 Div. 20
OTS price $1.25

Naval Radiological Defense Lab., San Francisco, Calif.
AN AUTOMATED FAST COINCIDENCE NUCLEAR RADIATION SPECTROMETER,
by J. P. Hurley. 6 Mar 64, 44p.
Proj. SR011 01 01, Task 0401
NRDL TR729 Unclassified report

Descriptors: (*Nuclear radiation spectrometers, Design), (*Coincidence counting, Radiation measurement systems), Automatic, Construction, Performance (Engineering).

A fast coincidence nuclear radiation spectrometer is described. The general features of the design and performance are discussed together with a detailed description of the automation system. (Author)

AD-600 145 Div. 20, 19
OTS price $2.25

General Precision Lab., Inc., Pleasantville, N. Y.
NUCLEAR GYROSCOPE STUDY.

This report presents in tabular and graphical form data from experimental measurements of scattered gamma radiation from slabs of aluminum and steel. Monoenergetic gamma rays from Cs137 and Co60 sources with plane-normal incidence were used as irradiation sources. Detection angles used were 5, 10, 20, 30, 45, and 60 deg with effective thicknesses of one, two, three, four, and five 'mean-free-paths' of slab material. Since it was desirable to have spectra for larger angles (75 and 85 deg), a method of extrapolation was devised. The extrapolated spectra are presented in the text. Also included in this report are calculations of dose and build-up factors. There is also shown (in graphical form) how the over-all dose rate is affected by the added extrapolated spectra. (Author)

AD-600 447 Div. 20, 2
OTS price $1.25

Travelers Research Center, Inc., Hartford, Conn.
THE INFLUENCE OF LOCAL WINDS ON FALLOUT.
Progress rept. no. 1, 1 July-31 Dec 63,
by Pieter J. Feteris, Edwin Kessler, III, and Edward A. Newburg. 31 Dec 63, 45p.
Travelers7456 122
Contract DA36 039AMCQ3283E, Proj. 3A99 27 005
Unclassified report

Descriptors: (*Radioactive fallout, Airborne), (*Wind, Atmospheric motion), Particles, Sea breeze, Diffusion, Particle trajectories, Atomic clouds, Air mass analysis, Nuclear explosions, Atmosphere models.

Model local circulations are discussed with regard to their influence on the disposition of airborne particles in a non-precipitating, non-diffusive atmosphere. Two-dimensional vertical circulations like the sea breeze along a straight coast, or like the circulations near mountain ranges, when steady-state, principally affect the time of establishment of a pattern and not its shape or the ultimate patterns of the total accumulations at the ground. When such calculations intensify or decay during the passage of fallout through them, both the duration and onset time of fallout at ground locations can be affected, with associated local changes of total accumulation. Three-dimensional local circulations affect the place of deposit of airborne particles and the time of their deposition. Circulations confined to the horizontal plane can affect the place of deposit and shape of a fallout pattern, but vertical air currents must occur to change the time of its establishment. Three-dimensional divergence accompanying vertical currents in the real compressible atmosphere significantly increases local concentrations in only those cases where updrafts are about equal to particle fall speeds; in such cases, the role of diffusion should be simultaneously considered. The influence of local circulations, in any case, is greatest with respect to the smallest (slowest falling) particles. (Author)

AD-600 489 Div. 20
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SURPRISES OF ATOMIC NUCLEI: INSTANTANEOUS DECOMPOSITION OF HEAVY ELEMENTS.
1 Apr 64, 4p.
FTD TT64 89; TT 64 11714
Unclassified report

Unedited rough draft trans. from Pravda (Moscow) 1963, no. 327, p. 4.

Descriptors: (*Nuclei, Decomposition), (*Americium, Nuclei), Nuclear reactions, Half life, Isotopes.

AD-600 493 Div. 20
OTS price $1.60

Naval Research Lab., Washington, D. C.
DOSIMETERS OF IONIZING RADIATION BASED ON THE MEASUREMENT OF THERMOLUMINESCENCE OF ALUMO-PHOSPHATE GLASSES (IKS DOSIMETERS),
by I. A. Bochvar, A. A. Vasil'eva, I. B. Keirim-Markus, T. I. Prosina and Z. M. Syritskaya.
24 Mar 64, 14p.
NRL Trans972; TT 64 15841
Unclassified report

Dozimetry Ioniziruyushchikh Izluchenii, Osnovannye na Izmerenii Termolyuminestsentsii Alyumofosfatnykh Stekol (Dozimetry ''IKS''). Trans. of #Atomnaya Energiya (USSR) 1963, v. 15, no. 1, p. 48-52.

Descriptors: (*Health physics instrumentation, Dosimeters), (*Dosimeters, Materials), (*Glass, Luminescence), (*Aluminum compounds, Phosphates), Design, Effectiveness, Radiation damage.

Dosimeters developed from glass can be used for the dosimetry of beta-gamma radiation, of slow neutrons and of high energy charged particles ranging from 0.02 - (1 to 2). 10 to the 6th power rad. These dosimeters can accumulate and store information for a prolonged period of time (at 150 C up to a month). The thermoluminescence of crystal phosphors had been repeatedly proposed to be used for dosimetry. Phenomena of radiophoto-luminescence and color variation of the glass under exposure to irradiation were utilized. A description is made of the thermoluminescant dosimeters made of alumnophosphate glasses. The study was also concerned with the polycomponent glasses containing two or more elements of I and II groups as well as of silicon dioxide. (Author)

AD-600 583 Div. 20
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SILICON DETECTORS OF THERMAL NEUTRONS,
by J. Chwaszczewska and A. Szechter. 26 Mar 64, 8p.
FTD TT64 95; TT 64 11688 Unclassified report

Unedited rough draft trans. of Nukleonika (Poland) 1963, v. 8, no. 7, pp. 489-493.

Descriptors: (*Radiation measurement systems, Neutron detectors), (*Thermal neutrons, Neutron detectors), (*Neutron detectors, Silicon), Crystal counters, Boron, Lithium, Uranium, USSR.

Surface-barrier silicon detectors of heavy charged particles were used for the detection of thermal neutrons by means of covering them with layers of boron, lithium, or uranium. There were obtained detectors of thermal neutrons with sensitive surface of 10-500 sq mm using silicon with a specific resistance of 265 ohm-cm. and 1,000 ohm-cm. The effectiveness was measured and some characteristics were determined. (Author)

Final rept.
Apr 64, 35p.
Contract OCD OS62 197
Unclassified report

Descriptors: (*Radiation measurement systems, Calibration), Gamma counters, Electrometers, Test equipment, Circuits, Construction, Production, Costs.

A research and development program was conducted to design and produce the OCD Item No. CD V-797 Calibrator, which was to be used for field radiation calibration and range checking of the OCD Item No. CD V-711 Remote Sensor Radiation Meter. Each calibrator comprised a small Cesium-137 source with an electrometer and high voltage test circuit. Two prototype models of the calibrator were constructed, and each was used to standardize three CD V-711 remote sensors. Comparisons were made with R-meter calibrations, and estimates were derived for over-all accuracy and precision. Measurements were also made to assure conformance to AEC and ICC specific device requirements. The report contains laboratory test data, assembly and schematic drawings, production cost estimates, and parts lists. (Author)

AD-600 303 Div. 20, 17
OTS price $2.60

Naval Research Lab., Washington, D. C.
IRRADIATION EFFECTS ON STRUCTURAL MATERIALS.
Quarterly progress rept., 1 Nov 62-31 Jan 63,
by L. E. Steele, J. R. Hawthorne and H. E. Watson. 15 Feb 63, 21p.
Contract AT49 5 2110
NRL MR1393 Unclassified report

Descriptors: (*Radiation damage, Neutrons), (*Steel, Radiation damage), (*Reactor materials), Neutrons, Stresses, Heat treatment, Metal plates, Ductility, Structural parts, Pressure vessels, Nuclear reactors.

Progress is reported on the NRL Metallurgy Division program for the study of the effects of neutron irradiation upon the properties of structural materials. The report describes new data on the effects of several experimental variables on the observed recovery of properties of irradiated steels, the notch ductility of the SL-1 reactor pressure vessel, results of neutron environmental survey of the SM-1A reactor and new equipment and procedures for in-reactor experimentation and for postirradiation evaluation of irradiated materials. (Author)

AD-600 358 Div. 20
OTS price $2.25

Naval Civil Engineering Lab., Port Hueneme, Calif.
INTERIM CALIBRATION AND PROCEDURES FOR GM DETECTOR,
by Leonard B. Gardner and Bernard Burdick.
27 Mar 64, 81p.
Proj. Y F008 08 05 201, DASA11 026
NCEL TN559 Unclassified report

Descriptors: (*Radiation measurement systems, Calibration), (*Neutron detectors, Calibration), Neutron spectrum, Neutron scattering, Neutron counters, Foils, Decomposition.

The interim calibration of a GM nuclear detector is described. Interlaboratory comparison of calibration data was utilized. The geometry, backscatter, self scatter and self absorption, air and window absorption, window scatter, and shield and holder scatter corrections were determined for weightless point sources upon backless material. Corrections were also determined for spread sources up to 2 inches in diameter. These corrections may be utilized in future experiments to obtain the disintegration rate of activated neutron foil detectors from measurements of the foil counting rate. Such data is necessary when foils of different thickness are utilized as will be done in the study of neutron energy distribution in ducts. (Author)

AD-600 371 Div. 20
OTS price $.50

RAND Corp., Santa Monica, Calif.
COMMENTS ON 'THE SECULAR INCREASE OF THE WORLD-WIDE FINE PARTICLE POLLUTION',
by G. F. Schilling. May 64, 8p. P2910
Unclassified report

Descriptors: (*Radiological contamination, Air pollution), (*Air pollution, Radiological contamination), Health physics, Standards, Measurement, Electrical conductance, Nuclear explosions, Tests, Radioactive fallout, Particles.

Current methods employed to measure radiological contamination of the air are surveyed and evaluated.

AD-600 386 Div. 20
OTS price $7.60

Naval Research Lab., Washington, D. C.
NRL QUARTERLY ON NUCLEAR SCIENCE AND TECHNOLOGY.
Progress rept. for the period July-Sep 63.
1 Oct 63, 71p.
NP 13896 Unclassified report

Descriptors: (*Scientific research, Nuclear physics), (*Nuclear physics, Scientific research), (*Periodicals, Nuclear physics), Model theory, Mesons, Pions, Equations, Momentum, Parity, Functions, Electron beams, Computers, X-ray filters, Plasma physics, Solenoids, Storage tubes.

Contents: Extension of the Fermi-Yang Model, by D. W. Joseph; The Lee Model and the rho Meson, by D. W. Joseph and W. W. Wada; One-Dimensional Electron Beam Model: Computer Experiments, by G. H. Herling and Laura C. Davis; Graphite Filtering of Bremsstrahlung X-rays, by M. E. Toms; One-Dimensional Electron Beam Model: Equilibrium of Small Systems, by G. Herling; Filamentary Phase Space Configurations for a Sheet Beam, by D. C. dePackh; A Solenoid-Focused Guide Ring for the Storage of an Intense Electron Beam (the Sozotron) -- Report no. 3, by D. dePackh, R. Close, L. Davis, J. Ehrman, et al.

AD-600 392 Div. 20
OTS price $1.75

Naval Radiological Defense Lab., San Francisco, Calif.
PENETRATION OF PLANE NORMAL GAMMA RAYS THROUGH SLABS OF ALUMINUM AND STEEL. III. PROCESSED NUMERICAL DATA,
by J. T. Serduke and C. V. Smith. 17 Feb 64, 69p.
Proj. SF011 05 11, Task DASA11 038
NRDL TR730 Unclassified report

Descriptors: (*Gamma-ray spectra, Measurement), (*Mathematical prediction, Gamma-ray spectra), Gamma rays, Penetration, Aluminum, Steel, Experimental data, Gamma-ray scattering, Radiation measurement systems, Photons, Graphics, Tables, Dose rate.

comp. by Charlie M. Pierce. Sep 63, 61p. LMSC6 90 63 96, SRB63 7

Unclassified report

Descriptors: (*Neutron flux, Measurement), (*Bibliographies, Neutron flux), Radiation measurement systems, Abstracts.

The references cited deal with all aspects of neutron flux measurements. Most of the references were published between June 1959 and June 1963. The references are alphabetically arranged according to the first author. Corporate and personal author indexes are included. (Author)

AD-600 709 Div. 20
OTS price $2.60

Maryland Univ., College Park.
THE CORIOLIS ANTI-PAIRING AND THE BLOCKING EFFECTS IN DEFORMED EVEN-EVEN NUCLEI.
Technical rept.,
by Amand Faessler, Walter Greiner and Raymond K. Sheline. Apr 64, 27p. MUP TR372
Contracts AT40 1 2434, Nonr179700

Unclassified report

Descriptors: (*Quantum mechanics, Nuclei), (*Even-even nuclei, Quantum mechanics), (*Coriolis effect, Even-even nuclei), Nuclear spins, Vibration, Hamiltonian, Nuclear energy levels, Nuclear moments, Osmium, Uranium.

The additional effects of the Coriolis Anti-Pairing and blocking on the 2nd Order Rotational Vibrational Hamiltonian are discussed for even-even nuclei. This leads to lower limits on the pairing correlation energy (W sub o) and the critical spin I sub c introduced by Mottelson and Valatin. Typical lower limits deduced from presently available experimental data are W sub o = 2 - 3 Mev and I sub c = 24 (Os186) and 50 (U238). The blocking constant deduced from experiment is in agreement with the theoretical estimate. (Author)

AD-600 710 Div. 20
OTS price $4.60

Maryland Univ., College Park.
THE DYNAMIC COLLECTIVE THEORY OF ODD-A NUCLEI.
Technical rept.,
by Michael Danos, Walter Greiner, and C. Byron Kohr. May 64, 48p. MUP TR381
Contract Nonr179700

Unclassified report

Prepared in cooperation with National Bureau of Standards, Washington, D. C.

Descriptors: (*Quantum mechanics, Nuclei), (*Odd-odd nuclei, Quantum mechanics), Nuclear resonance, Mathematical models, Selection rules, Photons, Nuclear cross sections, Hamiltonian, Wave functions, Operators (Mathematics), Isomeric transitions, Nuclear energy levels, Theory.

The unified model and the collective giant dipole resonance model are unified. The resulting energy spectrum and the transition probabilities are derived. A new approximate selection rule involving the symmetry of the gamma-vibrations is established. It is verified that the main observable features in the photon absorption cross section are not influenced by the odd particle, despite the considerably richer spectrum of states as compared to even-even nuclei. (Author)

AD-600 755 Div. 20
OTS price $9.10

Ballistic Research Labs., Aberdeen Proving Ground, Md.
NEUTRON REFLECTION AND FLUX VERSUS DEPTH FOR ALUMINUM WITH AN APPENDIX. NEUTRON DOSE TRANSMISSION VERSUS THICKNESS.
Rept. no. 5,.
by Frank J. Allen, Arnold T. Futterer and William P. Wright. Feb 64, 103p.
Proj. 1A022601A088
BRL 1238

Unclassified report

Descriptors: (*Aluminum, Neutron flux), (*Neutrons, Aluminum), (*Neutrons, Reflection), Neutron scattering, Shielding, Transport properties, Energy, Statistical data, Thickness.

Detailed calculated results of neutron reflection and flux versus depth for aluminum are given in the form of machine printouts. The angular and energy distributions of the reflected neutrons along with the energy-dependent and total flux at various depths are contained in tabular form on the printouts. Neutron number current, number flux, and dose transmission, as functions of thickness, are also given in tabular form on the printouts. A table of summary information on reflection is presented. This contains number current, number flux, dose, and energy reflection factors as functions of incident energy and angle. A few figures are presented to illustrate graphically the various tabular results. An appendix contains the dose transmission results as a function of incident angle and slab thickness for the various incident energies. (Author)

AD-600 761 Div. 20, 8
OTS price $.75

Williamson Development Co., Inc., Concord, Mass.
STUDIES AND INSTRUMENTATION FOR ACCELERATING PARTICLES IN A PLASMA.
Final rept.,
by Joseph G. Kelley, Allen G. Rubin, and Ivan A. Nichols. 29 May 64, 29p.
Contract AF19 628 309, Proj. 8608, Task 860804
AFCRL 64 412

Unclassified report

Descriptors: (*Particle accelerators, Design), (*Plasma physics, Betatrons), (*Betatrons, Plasma physics), Instrumentation, Lasers, Interferometers, Shock tubes, Vacuum apparatus, Feasibility studies.

This report discusses the Plasma Betatron. The Betatron was designed, built and operated as proposed. Suggestions are made for future modifications. Transient optical measurements are discussed. An image converter camera was incorporated into the existing experiments. Infrared devices, particularly a laser interferometer, was designed. A 6 inch arc driven shock tube facility was planned, set up and placed in operation. Significant modifications to the vacuum system and the high voltage system were completed. Various instrumentation problems are discussed. The conclusions reached in each of these phases are presented. Appendices present theoretical details for two experiments - the infrared interferometer and the plasma conductivity measurement. (Author)

AD-600 767 Div. 20
OTS price $3.00

Bureau of Ships, Washington, D. C.
INSTRUMENTS AND METHODS OF ANALYSIS OF RADIATION,

AD-600 602 Div. 20, 2
OTS price $1.25

Isotopes, Inc., Westwood, N. J.
PROJECT STAR DUST.
Quarterly rept. no. 8,
by James P. Friend, Herbert W. Feely and Micah W. M. Leo. 1 May 63, 44p.
Contract DA49 146XZ079
DASA 1308 Unclassified report

Descriptors: (*Radioactive fallout, Mathematical models), (*Radiological contamination, Stratosphere), (*Stratosphere, Radioactivity), Air pollution, Nuclear explosions, Fission products, Natural radioactivity, Radioactive isotopes, Barium, Strontium, Manganese, Antimony, Beryllium, Lead, Polonium, Tropopause, Troposphere.

High concentrations of total beta activity and of short-lived fission products, such as Ba140, were found in the stratosphere of the Northern Hemisphere during late 1962 and early 1963, mainly as a result of the late 1962 Soviet series of nuclear weapons tests. The apparent stratospheric burden of Sr 90, as calculated from the distribution of that nuclide in the Star Dust sampling corridor, had increased to approximately 7.8 megacuries by Jan-Feb 63. The apparent burden of Mn54 in the stratosphere of the Northern Hemisphere, corrected for decay to 15 Oct 61, reached 45 megacuries by late 1962 and 75 megacuries by Jan-Feb 63. This probably indicates that large amounts of Mn54 were produced during the 1962 Soviet test series as well as during the 1961 test series. It is evident that large quantities of Sb124 were produced during the 1962 Soviet test series, apparently by the late Dec 62 tests. The stratospheric distribution of the cosmic ray product, Be7 approximated the theoretical distribution during early 1960 and mid-1961, but artificial Be7 produced during the 1961 Soviet and 1962 U. S. test series distorted the distribution of this nuclide during 1962. (See also AD-432 153) (Author)

AD-600 605 Div. 20
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
REACTION OF He3 WITH DEUTERONS,
by A. P. Klyucharev, A. K. Val'ter and B. N. Esel'son. 14 Apr 64, 9p.
FTD TT63 991; TT 64 11695 Unclassified report

Unedited rough draft trans. of mono. (Konferentsiya) po Mirn(onu) Ispol'zovaniyu Atomn(oi) Energii, Kiev, 1958. Trudy, p. 64-69.

Descriptors: (*Helium, Deuteron bombardment), (*Isotopes, Nuclear cross sections), (*Deuteron bombardment, Helium), Excitation, Nuclear cross sections, Deuterons, Resonance absorption, USSR.

An investigation was made of the cross section of He3(d,p)He4 reactions in the zone of energies of bombarding neutrons 100-1500 kev by the registration of alpha particles. The function of exciting the reaction of He3(d, alpha) H1 was measured by us several times and no divergence was discovered in the output of alpha-particles within limits of statistical dispersion between individual measurement series. The table carried values of differential cross section measured by us in relation to the energy of deuterons falling under a 90 degree angle in direction of the ion beam are presented graphically. These results confirm the discovery by us resonance process of He3(d,p) He4 reactions with position of the resonance maximum at a deuteron energy, equalling 435 + 30 kev. The magnitude of the differential cross section in the maximum is 63.4 millibarn/steradians (barn = 10 to the minus 24th power sq cm, and drops monotonously to a value of 11 milibarn/steradians at an energy of 1500 kev. The error in determining this value is ± 7%. (Author)

AD-600 684 Div. 20
OTS price $.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
A SEMIEMPIRICAL FORMULA FOR DIFFERENTIAL DOSE ALBEDO FOR NEUTRONS ON CONCRETE.
Technical note,
by Y. T. Song. 27 Mar 64, 21p.
Task Y F008 08 05 201, DASA11 026
NCEL N589 Unclassified report

Descriptors: (*Neutron scattering, Albedo), (*Albedo, Neutron scattering), (*Concrete, Neutron scattering), Shielding, Radiological dosage, Nuclear scattering, Monte Carlo method, Equations.

A semiempirical formula is developed which yields values for the differential dose albedo of neutrons on concrete. Neutrons of incident energies 0.1, 0.25, 0.5, 1, 2, 3, 5 and 14 Mev are considered. Results show that a one-parameter formula gives satisfactory agreement with Monte Carlo calculations. A simple analytic form also gives satisfactory results except in low energy regions. The principal sssumption involved in the theoretical analysis is that the actual reflection process can be approximated by a simplified neutron scattering model; namely that the scattering of neutrons in concrete is isotropic in the laboratory system. (Author)

AD-600 698 Div. 20
OTS price $.75

Naval Radiological Defense Lab., San Francisco, Calif.
A SEMI-EMPIRICAL STUDY OF THE SHELL MODEL PROTON-NEUTRON INTERACTION,
by J. M. Ferguson. 18 Feb 64, 30p.
Proj. SR011 01 01, Task 0401
NRDL TR723 Unclassified report

Descriptors: (*Nuclear shell models, Odd-odd nuclei), (*Proton reactions, Nuclear shell models), (*Neutron reactions, Nuclear shell models), Nucleons, Harmonic oscillators, Integral equations, Nuclear spins, Nuclear structure.

The effective proton-neutron interaction in nuclei is approximated by an extreme short-range force with an ordinary and a spin-dependent component. This interaction is applied to several odd-odd nuclei with two nucleons (or holes) outside of closed shells throughout the periodic table. Simple Harmonic Oscillator wave functions are used to evaluate dependent to ordinary force are determined empirically. It is found that the simple model reproduces the interaction with about 30 percent accuracy. It also indicates a stronger interaction energy should be used when the proton and neutron are in the same single-particle state than when they are in different states. (Author)

AD-600 707 Div. 20
OTS price $1.75

Lockheed Missiles and Space Co., Sunnyvale, Calif.
NEUTRON FLUX MEASUREMENTS: AN ANNOTATED BIBLIOGRAPHY,

22. ORDNANCE

AD-600 058 Div. 22
OTS price $.75

Naval Ordnance Lab., White Oak, Md.
INITIATION OF EXPLOSIVES BY EXPLODING WIRES. III. EFFECT OF WIRE DIAMETER ON THE INITIATION OF PETN BY EXPLODING WIRES,
by Howard S. Leopold. 17 Mar 64, 27p.
NOL TR64 2 Unclassified report

Descriptors: (*Explosives initiators, Exploding wires), (*Exploding wires, Explosives initiators), (*PETN, Detonations), Wire, Platinum, Physical properties, Firing circuits, Capacitors, Reliability.

The effect of wire diameter on the initiation of PETN by exploding platinum wires was investigated. A one microfarad capacitor charged to 2,000 volts was used as the energy source for exploding the wires. The diameter of the wire can be chosen so as to favor time reproducibility of explosion, reliability of effecting detonation, or vigor of the bridgewire output. The wire with the most vigorous shock output when tested in air is not necessarily the most efficient for effecting detonation when PETN is loaded on the wire. (Author)

AD-600 059 Div. 22
OTS price $.75

Naval Ordnance Lab., White Oak, Md.
ANALYSIS OF THE OPTICAL DETERMINATION OF DETONATION VELOCITY IN SHORT CHARGES,
by A. R. Clairmont and I. Jaffe. 16 Mar 64, 27p.
NOL TR64 23 Unclassified report

Descriptors: (*Tetryl, Detonations), (*Charges (Explosive), Detonations), (*Detonations, Photographic analysis), Explosive materials, Velocity, Optical analysis, Transformations (Mathematics), Shock waves, Propagation.

A transformation equation was derived whereby the data from smear camera records of the peripheral detonation of a short (L/D of 2.5) tetryl charge can be interpreted to obtain a detonation velocity measurement. The results are in excellent agreement with the values measured along the axis as well as with those published in the literature. (Author)

AD-600 087 Div. 22
OTS price $2.25

RAND Corp., Santa Monica, Calif.
CHARTS FOR DETERMINING THE CHARACTERISTICS OF BALLISTIC TRAJECTORIES IN A VACUUM,
by Deane N. Morris. Apr 64, 84p. RAND RM3752PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Ballistics, Trajectories), (*Trajectories, Plotters), Vacuum, Suborbital trajectories, Position finding, Graphics, Equations, Spacecraft, Terminal ballistics.

A summary of information on the trajectories of ballistic vehicles traveling in a vacuum about a nonrotating, spherical earth is presented. The graphs presented are designed to permit the user to determine with reasonable accuracy the more important parameters connected with unpowered flight outside the atmosphere. These include the range, time of flight, apogee altitude, terminal velocity, and terminal flight-path angle, all as functions of the burnout velocity, the burnout angle, and the burnout and terminal altitudes. Charts are given for quickly establishing the values of velocity, flight-path angle, time, and range along the trajectory. The range of variables examined includes burnout altitudes from 400,000 to 1,000,000 ft, burnout velocities from 2500 ft/sec to escape velocity, and burnout flight-path angles between -30 and 90 deg. Many of the graphs are presented in 'carpet-plot' form to aid in interpolation and in the visualization of the trends of the parameters. (Author)

AD-600 189 Div. 22
OTS price $1.00

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
ENERGY MEASURING SYSTEM FOR XM5 TIMER,
by Edward Gibbs, Earl Straway and Abraham Mastbaum. May 64, 31p.
PA TM1393 Unclassified report

Descriptors: (*Timing devices, Energy), (*Firing mechanisms (Ammunition), Energy), (*Energy, Measurement), Dynamics, Transducers, Ammunition components.

The design and fabrication of a system to measure the kinetic energy of the firing pin in the XM5 Timer was accomplished using velocity transducers with appropriate read-out equipment. Experimental evaluation indicated that this technique rendered an accuracy of better than 2%. (Author)

AD-600 273 Div. 22
OTS price $1.00

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
SHAPED CHARGE SCALING.
Technical memorandum,
by Oscar A. Klamer. Mar 64, 31p.
PA TM1383 Unclassified report

Descriptors: (*Shaped charges, Scale), (*Explosive materials, Shaped charges), Cavity liners, Explosion effects, Shaped charge jets, Penetration, Alignment, Spin, Geometric forms.

The memorandum was prepared to provide a brief unclassified presentation of basic concepts, elementary design criteria and scaling techniques for shaped charges. The information is intended for individuals with little or no background in this field of munitions to provide them with sufficient data to understand design requirements for simple shaped charge items. (Author)

AD-600 287 Div. 22, 15
OTS price $.50

Booz-Allen Applied Research, Inc., Chicago, Ill.
SOME STATISTICAL METHODS OF ANALYSIS RELATED TO WEAPON EFFECTS.
Informal rept. no. 4.
May 64, 5p.
Contract DA18 108cm17174
Unclassified report

Descriptors: (*Weapon systems, Effectiveness), (*Statistical analysis, Weapon systems), Explosion effects, Optimization, Targets, Analysis of variance.

ed. by E. L. Stolarova. Mar 64, 182p.
BUSHIPS Trans841 Unclassified report

Trans. of Pribory i Metody Analiza Izluchenii (USSR) 1962, no. 3.

Descriptors: (*Radiation measurement systems, Nuclear particles), (*Nuclear particles, Measurement), Transformations, Nuclear scattering, Cobalt, Radioactive isotopes, Shielding, Dosimeters, Fast neutrons, Gamma rays, Gamma-ray spectra, Nucleons, USSR.

AD-600 874 Div. 20, 25
OTS price $.50

Stanford Univ., Calif.
NUCLEAR STRUCTURE.
Final rept., 1 Jan 55-31 Mar 64,
by W. E. Meyerhof. May 64, 8p.
Contract Nonr22519, Proj. NR024 011
Unclassified report

Descriptors: (*Nuclear structure, Scientific research), (*Low-temperature research, Scientific research), (*Atomic spectroscopy, Scientific research), (*Nuclear magnetic resonance, Scientific research), Bibliographies.

Topics include: summary of research supported by contract; published work supported by contract (73 refs); and Ph.D. theses supported by contract (23 refs).

21. NUCLEAR PROPULSION

No Entries

AD-600 445 Div. 22, 8
OTS price $2.60

Harry Diamond Labs., Washington, D. C.
A MAGNETIC CORE ARMING PROGRAMMER FOR THE COPPERHEAD II FUZE SYSTEM,
by M. J. Katz and G. W. Kinzelman. 20 Mar 64, 26p.
Proj. 1P523801A300
HDL TR1215 Unclassified report

Descriptors: (*Rocket fuzes, Programming (Computers)), (*Time delay fuzes, Magnetic cores), Magnetic core storage, Magnetic recording systems, Fuzes, Arming devices.

An arming programmer having a magnetic core decade divider as the basic functional block has been designed for the Copperhead fuze system. The maximum time that can be programmed is 100 sec with a maximum timing error of 0.1 sec. In addition to a firing pulse at T-0.0 sec, five output pulses at fixed times relative to T-0.0 are provided to initiate circuitry in the system. The timer has the capability of remote setting and once set does not require power for memory. (Author)

AD-600 485 Div. 22, 18, 20
OTS price $3.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
NUCLEAR WEAPONS AND THEIR EFFECTS,
by Kurt Langhans. 24 Mar 64, 164p.
FTD TT63 1061; TT 64 11708
Unclassified report

Kernwaffen und Ihre Wirkungen, trans. of Schriftenreihe Luftschutz (West Germany) 1961, no. 2, 126p.

Descriptors: (*Nuclear weapons, Explosion effects), (*Radiological warfare agents, Classification), Nuclear warfare, Nuclear explosion damage, Detonations, Underground explosions, Underwater explosions, Radiation damage, Radiation effects, USSR.

Contents: Classification of Nuclear Weapons; Vehicles and Means of Employment for Detonating Nuclear Weapons; The Tactical Possibilities of Radioactive Warfare Agents; The Types of Detonation and Their Disguishing Features; Nuclear-Weapon Targets; Description of Various Types of Detonations at 20 Kilotons of TNT at Distances of 5 to 10 km; The Impression in Cases of Different Calibers and Distances; Influence of Weather and Other Factors on the Detonation Pattern; The Pressure Wave as an Annihilating Factor; Luminous Radiation as an Annihilating Factor; Nuclear Radiation as an Annihilating Factor; The Immediate Nuclear Radiation; The Residual Nuclear Radiation; and Protection From Nuclear Weapons.

AD-600 516 Div. 22
OTS price $1.25

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
MALFUNCTION INVESTIGATION OF SIMULATOR, PROJECTILE AIR BURST: M74.
Technical rept.,
by Benjamin Kroll and George H. Nilsen. Apr 64, 43p.
PA TR3141 Unclassified report

Descriptors: (*Projectiles, Air burst), (*Air burst, Simulator), (*Simulators, Malfunctions), Detonators, Propelling charges, Fuzes (Ordnance), Safety, Ordnance.

Malfunction investigation of simulator, projectile air burst: M74 was undertaken to determine the following: (1) What caused premature bursts of simulators; (2) How to prevent recurrence of similar prematures; and (3) How to dispose of defective materiel. The prematures under investigation were caused by defective crimping of the closing disc in the charge case assembly. (Author)

AD-600 537 Div. 22
OTS price $.75

Springfield Armory, Mass.
VEHICULAR MOUNT SIMULATOR-ANALYZER.
Technical rept.,
by D. Gelfond. 12 Sep 63, 23p.
Proj. M1 3 50016 02M1M6
SA TR20 2902 Unclassified report

Descriptors: (*Gun mounts, Recoil mechanisms), (*Hydraulic servomechanisms, Feasibility studies), Springs, Linear systems, Simulation, Feedback, Servomechanisms, Structural properties, Gun auxiliary equipment.

An investigation has been conducted of the feasibility of using a hydraulic servomechanism to simulate the characteristic of a spring. The response of a displacement feedback servo system to a disturbance at its mechanical output point is determined analytically, and it is shown that the characteristic of a linear spring is defined. Experimental results confirm the theoretical analysis within the limits of practical components. Modification of servovalve gain characteristic is necessary to improve usable linear range. (Author)

AD-600 558 Div. 22, 12
OTS price $.50

Magnavox Co., Urbana, Ill.
SOLID-STATE ARM SAFE DEVICE (PHASE IV).
Monthly progress rept. no. 1, 2 Mar-1 Apr 64,
by L. W. Ricketts. 2 Apr 64, 10p.
Contract DA11 022ORD4048
Unclassified report

Descriptors: (*Arming devices, Guided missile warheads), Semiconductor devices, Amplifiers, Guided missile safety.

Results are given of preliminary studies on the design, development, and fabrication of pillbox transducers and miniature solid state arm safe devices capable of functioning in various warheads for Army missiles and under a wide range of environmental conditions. (Author)

AD-600 655 Div. 22, 17
OTS price $.75

Springfield Armory, Mass.
TENSILE AND IMPACT PROPERTIES OF INVESTMENT CAST STEELS,
by J. F. Panda. 5 Aug 63, 24p.
SA TR19 1006 Unclassified report

Descriptors: (*Casting, Mechanical properties), (*Steel, Casting), (*Small arms), Tensile properties, Toughness, Tests.

An investigation was made to determine tensile and impact properties of investment-cast steels used for small arms components. Tensile bars of 1/4-inch diameter were cast to finished dimensions. Impact bars were cast to allow for the

Two statistical approaches are indicated which might be employed in relating burst heights (or fuzing times) to target and operational parameters. (Author)

AD-600 294 Div. 22, 8, 30
OTS price $2.25

Naval Ordnance Test Station, China Lake, Calif.
FUNCTIONAL DESCRIPTION OF THE DIGITAL-ANALOG SERVO SYSTEM.
Technical rept.,
by Claude W. Brown and Sara G. Valdivia. Mar 64, 96p.
NOTS TP3478 Unclassified report

Descriptors: (*Servomechanisms, Operation), (*Fire control system components, Servomechanisms), (*Digital-to-analog converters, Servomechanisms), Ordnance, Naval gunnery, Design, Operation.

The digital-analog servo system (DASS) accepts digital position data from shaft-angle encoders on a launcher as well as digital target-position and velocity data from a general-purpose digital computer. The computer position information is updated and compared with the encoder-position readout to obtain an error signal; errors in bearing and elevation are then translated to analog signals and sent to the launcher drive elements to correct the launcher aimpoint. This report, which documents the design of the system and its operation, can also be used as a trouble-shooting guide. (Author)

AD-600 313 Div. 22, 27
OTS price $9.60

American Machine and Foundry Co., Stamford, Conn.
ENGINEERING AND DESIGN OF AUXILIARY PROPULSION KIT FOR 105 MM HOWITZER XM 102 AND TEST PROGRAM.
Final rept., 7 Jun 63-6 Apr 64,
by A. Bonanno. 6 Apr 64, 118p.
Contract DA11 070AMC13
Unclassified report

Descriptors: (*Gun auxiliary equipment, Howitzers), (*Self-propelled guns, Howitzers), (*Howitzers, Propulsion), Guns, Mobile, Hydraulic pressure pumps, Performance (Engineering).

This report summarizes the work done during the period 7 June 1963 to 6 April 1964. Phase IIA consisted of engineering and design of an auxiliary propulsion kit to provide the 105 MM Howitzer XM 102 with its own mobile power and to improve its present mobility. The objective was to prepare assembly and detail drawings with supporting calculations and performance predictions. Phase IIB consisted of testing several hydraulic motor and pump components submitted by vendors. The objective was to determine which motor and pump combination would achieve the lowest weight and highest efficiency. (Author)

AD-600 341 Div. 22
OTS price $.50

Naval Research Lab., Washington, D. C.
A COMPARISON OF SHOCK AND ISENTROPIC HEATING ON LIGHT-GAS GUN COMPRESSION,
by J. R. Baker. 13 Apr 64, 9p.
NRL 6063 Unclassified report

Descriptors: (*Light gas guns, Performance (Engineering)), (*Light gas guns, Shock waves), Guns, Projectors (Ordnance), Shock (Mechanics), Heating, Projectiles, Velocity, Entropy, Temperature, Compressive properties.

An ideal model of light-gas gun operation that permits the evaluation of the effectiveness of shock heating in the light gas as opposed to the heating due to isentropic compression is hypothesized. This model assumes a shock wave generated by a piston which is instantly accelerated to some constant velocity. After the shock wave traverses the compression tube of the gun four times, it is followed by isentropic compression which absorbs all of the piston energy. The temperatures arrived at by shock compression and isentropic compression are compared when the pressures of the final states are equal. The results indicate that for reasonably fast pistons (around 6000 fps), the ideal temperature gains are on the order of 30 percent and the corresponding sound speed gains are only about 15 percent. The resulting increase in projectile velocity under these conditions cannot exceed 15 percent. Real gas effects would be expected to make this value still lower. It is concluded consequently, especially for the gun configurations currently used at NRL, that shock heating is not an important factor in the gun operation nor a particularly fruitful means of enhancing gun performance. (Author)

AD-600 376 Div. 22
OTS price $5.60

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
DEVELOPMENT TESTING OF THE PHASE I ARMAMENT SUBSYSTEM HELICOPTER 2.75-INCH ROCKET LAUNCHER XM3,
by Carl Huber and John Gassaway. 31 Dec 62, 58p.
Proj. 5517 05 022
AMC RA RT TM62 52 Unclassified report

Descriptors: (*Rocket launchers, Performance (Engineering)), Helicopters, Aircraft fire control systems, Jettisonable equipments, Firing tests (Ordnance), Flight testing.

This report presents data and information concerning tests of Phase I Armament Subsystem, Helicopter 2.75-inch Rocket Launcher, XM3, including modular pod jettison tests, flight rocket firing accuracy tests, and miscellaneous tests. The weapon system tested consisted of two 24-tube launcher pods containing a maximum of 48 2.75-inch folding fin aircraft rockets and a fire control system with sighting, computing, and weapon servo drive capabilities. The design and development of the system are considered adequate for a Phase I program and all major problems encountered have been successfully resolved. (Author)

AD-600 378 Div. 22, 30
OTS price $1.25

Harry Diamond Labs., Washington, D. C.
FUZE SIMULATOR VEHICLE,
by P. F. Ingersoll. 24 Feb 64, 44p.
Proj. 44140
HDL TR1201 Unclassified report

Descriptors: (*Fuzes (Ordnance), Simulators), Telemeter systems, Timing devices, Power supplies, Operation, Test equipment.

The operation of a long life fuze simulating test instrument is described. This test instrument which accommodates different fuze types by using interchangeable plug-in fuze oscillators and amplifiers, will operate several hundred hours with no maintenance other than battery changing. A five-channel telemeter, a remote control receiver, and a rechargeable power supply are included in the system. Separate reports covering the theory of operation of the fuze system are to be issued. (Author)

DETERMINING THE MILITARY CAREER FORCESTRUCTURE, WASHINGTON, D. C., MAY 28-29, 1963.
Symposium rept.
1964, 80p.
ONR ACR85 Unclassified report

Report on Job Analysis in the Military Services.

Descriptors: (*Military personnel, Personnel management), (*Air Force personnel, Personnel management), Naval personnel, Performance (Human), Training, Armed forces research, Job analysis, Computers, Decision making, Symposia.

Contents: How Professional Should Our Enlisted Force Be; The USAF Airman Carrer Force Structure; USAF Program Change Simulation: Concepts and Model; CAPRI (Computerized Advanced Personnel Requirements Information); Development of a New USMC Manpower Control System; Issues in Defining the Research Problem; Criteria for Career Force Structure; and The Naval Bureau of Personnel Program Plans.

AD-600 504 Div. 23, 4
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
CHEMISTS ON A CONSTANT ALERT.
25 Mar 64, 7p.
FTD TT64 192; TT 64 11722
Unclassified report

Trans. from Pravda, Moscow, 1963, no. 327, 23 Nov, p. 1.

Descriptors: (*Scientific personnel, Chemical engineering), Symposia, USSR, Production, Chemistry.

AD-600 505 Div. 23, 4
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SKILLFUL PERSONNEL FOR LARGE-SCALE CHEMISTRY,
by I. Gunar. 25 Mar 64, 8p.
FTD TT64 193; TT 64 11721
Unclassified report

Trans. from Izvestiya (USSR) no. 277, 23 Nov 1963, p. 3.

Descriptors: (*Scientific personnel, Chemistry), Scientific research, Production, Chemical engineering, Agriculture, Biology, USSR.

AD-600 697 Div. 23, 28, 30
OTS price $.75

American Inst. for Research, Palo Alto, Calif.
DELAY OF SELF-TESTING IN THREE TYPES OF PROGRAMED TEXT.
Technical rept. no. 8,
by Wayne A. Hershberger and Donald F. Terry.
May 64, 21p. AIR C28 5 64TR
Contract Nonr307700
Unclassified report

Descriptors: (*Learning, Test methods), (*Reading, Students), (*Programming (Computers), Teaching machines), Cybernetics, Education, Reaction (Psychology), Conditioned reflex, Effectiveness.

This study compared three intervals of delay (corresponding to the times required to read several words, paragraphs, or pages) between initial reading and subsequent self-testing for recall, in three types of programed texts. One type of text permitted the subject to reread before answering (Preview), another after answering (Review), and a third type exposed the correct answer after the subject responded (Confirmation). Three matched groups of pretested sixth graders, 55 in all, read the three types of programs and took a posttest. Both variables, program type and delay interval, affected program errors but neither affected gain scores. However, all delay intervals of self-testing were superior to no self-testing. Related research was reviewed from a cybernetic viewpoint. (Author)

AD-600 749 Div. 23, 19
OTS price $1.50

Human Resources Research Office, George Washington Univ., Washington, D. C.
ADVANCED LAND NAVIGATION: DEVELOPMENT AND EVALUATION OF A PROTOTYPE PROGRAM OF INSTRUCTION,
by Theodore R. Powers. Apr 64, 55p. HumRRO TR89
Contract DA44 188AR02, Proj. 2J024701A712
Unclassified report

Descriptors: (*Military training, Navigation), (*Navigation, Terrain), Army personnel, Compasses, Training devices, Terrain, Terrain avoidance, Maps, Map reading, Personnel management.

To enable infantrymen to acquire proficiency in advanced land navigation (ALN) techniques, an ALN performance requirement at the level of infantry advanced individual training (AIT) was developed in this study. Graduates of infantry AIT were tested on navigational routes of the level of difficulty prescribed by the performance requirement. This diagnostic assessment provided guidance for development of a 10-hour prototype program of instruction in ALN. The program was administered to 100 enlisted men whose performance was then evaluated on the prescribed navigational routes. In the experimental group, 50% of the men met the prescribed daytime performance requirement, as opposed to 5% of those without the experimental training; 76% met the performance requirement for nighttime navigation. The 10-hour program of instructiion in ALN can be used to train enlisted men to navigate accurately over difficult, unfamiliar terrain under all conditions of visibility. (Author)

AD-600 781 Div. 23, 28
OTS price $.50

Personnel Research Lab. (6570th), Aerospace Medical Div., Lackland AFB, Tex.
PREDICTION BY CAREER FIELD OF FIRST TERM AIRMAN PERFORMANCE FROM SELECTION AND BASIC TRAINING VARIABLES,
by Eli S. Flyer. Mar 64, 20p.
Contract AF41 609 1598, Proj. 7719, Task 771902
PRL TDR64 5 Unclassified report

Data reduction and computer operations performed by Teledyne Systems Corp.

Descriptors: (*Air Force personnel, Aptitude tests), (*Aptitude tests, Air Force personnel), Performance (Human), Military training, Mathematical predictions, Education, Statistical analysis, Military personnel.

To gain information that might be useful in improving airman classification, 29 predictor

machining of standard Charpy V-notched specimens. All tensile and impact specimens of each steel were heat-treated simultaneously and tempered at selected temperatures so that four levels of hardness could be obtained. Test results indicated that consistent and reproducible mechanical properties can be obtained for cast components when the castings are adequately gated and heat-treated. (Author)

AD-600 661 Div. 22
OTS price $4.60

General Electric Co., Burlington, Vt.
FLUID TIMER FOR ORDNANCE APPLICATIONS.
Quarterly rept. no. 3, 1 Jan-15 Apr 64,
by R. W. Avery, R A. Kantola and R. T. Ziemba.
30 Apr 64, 41p. R64APB13
Contract DA19 020AMC0213A, Proj. IR542709D362
Unclassified report

Descriptors: (*Timing devices, Ordnance), (*Pneumatic servomechanisms, Timing devices), Ordnance, Design, Amplifiers, Servo amplifiers.

This report describes the work carried out to develop a fluid timer demonstrator. The demonstrator uses fluid amplifiers without moving parts. Activity was concentrated on perfecting the operation of the counter stages and investigating new oscillator designs. The 17 stage counter was completed and final assembly of the demonstration timer package was started. (Author)

AD-600 665 Div. 22, 18
OTS price $.75

Edgerton, Germeshausen and Grier, Inc., Boston, Mass.
ELECTROMAGNETIC MEASUREMENTS DURING THE BANSHEE SERIES,
by Clyde B. Dobbie and Charles S. Fitzgerald.
30 Dec 63, 23p. EGG B2703
Contract DA49 146XZ092, Task DASA01 001
DASA 1451 Unclassified report

Descriptors: (*Electromagnetic waves, Monitors), (*Recording systems, Electromagnetic waves), (*Explosions, High altitude), Magnetic recording systems, Pentolite, Detonations, Balloons, Design.

Electromagnetic (EM) monitoring systems were assembled and operated during a portion of the BANSHEE test series at the White Sands Missile Range in the summer of 1961, to record the EM signals resulting from the detonations and to correlate this EM data with the photographic record of the fireball growth rate in an attempt to validate the 'magnetic bubble' EM generation theory. Each of the two EM monitoring systems, which had been operationally checked during the Pre-BANSHEE detonation at Aberdeen Proving Grounds in May of 1961, consisted of three mutually orthogonal loop antennas, low level amplifiers and matching networks, and multi-channel tape recorders. No discernible EM signals from the monitored detonations have been found in an analysis of the records of those events. (Author)

AD-600 668 Div. 22, 17
OTS price $6.60

General Electric Co., Philadelphia, Pa.
REVIEW AND ANALYSIS OF HIGH VELOCITY IMPACT DATA,
by E. P. Bruce. 1961, 67p.
Contract AF04 647 269
Unclassified report

Descriptors: (*Hypervelocity projectiles, Impact shock), (*Targets, Metals), Penetration, Cratering, Experimental data, Lead, Copper, Steel, Aluminum alloys, Tin, Cadmium, Zinc, Projectiles.

A thorough review was made of existing experimental data applicable to the impact of high velocity projectiles with semi-infinite metal targets. Empirical equations relating depth of penetration and crater volume to properties of the projectile and target were derived based upon the assumptions that: (1) projectile shape does not affect crater shape for projectiles which range from spheres to cylinders up to one caliber in length, and (2) craters are hemispherical. Both of these assumptions are supported by the available data. Additional data and/or a rigorous theoretical treatment of the problem are required to evaluate the utility of the equations at higher impact velocities. (Author)

AD-600 673 Div. 22
OTS price $2.25

Naval Weapons Lab., Dahlgren, Va.
THEORY AND APPLICATION OF QUALIFICATION TESTING PLANS FOR MUNITION DISPERSION,
by C. H. Wingo, Jr. 15 May 64, 92p.
NWL 1905 Unclassified report

Descriptors: (*Ordnance, Tests), (*Exterior ballistics, Statistical analysis), Statistical analysis, Sampling, Sequential analysis, Distribution, Theory.

This report illustrates the mathematical and statistical development of fixed and sequential sampling plans which could be used for qualification testing of munition dispersion. The theoretical development given is based upon the assumption that the dispersion of munition impacts is characterized by a circular normal distribution. Certain well known results for the circular error probability (CEP) are generalized to permit the treatment of impact percentages other than the conventional fifty percent. Numerical examples for various fixed and sequential sampling plans are provided. (Author)

AD-600 726 Div. 22, 12
OTS price $.50

Ballistic Research Labs., Aberdeen Proving Ground, Md.
EVAPORATIVE COOLING SHROUDS FOR SOUNDING ROCKET NOSECONES,
by James O. Pilcher, II. Feb 64, 12p.
Proj. 1A011001B021
BRL MR1547 Unclassified report

Descriptors: (*Nose cones, Cooling), (*Rocket noses, Sounding rockets), (*Evaporation, Cooling), Containers, Ethanols, Paper, Sweat cooling.

This report describes a simple, inexpensive and effective device for cooling a rocket nosecone to a desired temperature during pre-launch operations. (Author)

23. PERSONNEL AND TRAINING

AD-600 052 Div. 23
OTS price $2.00

Office of Naval Research, Washington, D. C.
INTER-SERVICE CONFERENCE ON TECHNIQUES FOR

AD-600 824 Div. 24, 22
OTS price $1.25

RCA Service Co., Patrick AFB, Fla.
STUDY OF EMULSION SHIFT ON BALLISTIC CAMERA PLATES,
by H. A. Starbird Jan 64, 43p.
Contract AF08 600 5200
MTC TDR-[illegible] Unclassified report

Descriptors: (*Photographic plates, Ballistic cameras), (*Photographic emulsions, Processing), Processing, Creep, Photographic chemicals, Linear systems, Acceptability.

Process treatments and emulsion batches were studied for their effect on the quantity of emulsion shift. Assignable linear vector shift of .4 micron per cm was identified; the assignable random emulsion shift appears to be in the order of .7 micron. The study indicated that the final rinse has the most significant process effect on both systematic and random shifts. The fixer, use or nonuse of a prehardener, different process runs and vertical vs. horizontal drying had no identifiable significant effects. The emulsion batches demonstrated significant effects. The reading error continues to be the most significant factor in error of position determination. It was concluded that an emulsion change between batch 1H1 and the other three batches has been beneficial; and further, that while the process treatments can be aligned for optimum treatment, no significant improvement in data quality can result from further process adjustment. (Author)

variables were evaluated by multiple regression techniques against a criterion of satisfactory performance during the first 2 years of enlistment. Variables included personal data, educational and aptitude data, peer ratings, and an instructor evaluation collected during basic training. The criterion was high airman performance rating vs low rating or discharge. Samples were drawn from 15 career fields. Predictive equations were derived for the full population and for each career-field sample. In all but 2 career fields prediction was improved by equations based on the career-field samples, but a full-population equation was judged more immediately useful. (Author)

24. PHOTOGRAPHY AND OTHER REPRODUCTION PROCESSES

AD-600 006 Div. 24, 26
OTS price $.50

Bell and Howell Co., Chicago, Ill.
ASPHERIC OPTICAL ELEMENTS PROGRAM.
Interim technical rept. no. 19, 1 Jan-31 Mar 64,
by Darryl Gustafson, Duwayne Stevens and Wesley Van Ornum. 31 Mar 64, 19p.
Contract AF33 600 37199
Unclassified report

Descriptors: (*Aspherical lenses, Production), (*Lenses, Production), Optical equipment components, Surfaces, Precision finishing, Machining, Temperature control, Electronic equipment, Programming (Computers), Glass.

Work was done concerning problems arising in the electronic control system of the machine, and in the temperature control system of the room in which the machine was located. The control system for the Y axis stepping motor was found to be unreliable and steps were taken to correct this situation. The temperature control system did not prove adequate to stabilize the room temperature, and the variations that were encountered in the machine behaviour because of this were beyond tolerable limits. It appears that the room temperature control was established and that variations fall within a total 1-degree range. A design of a 24 in. f/4.0 lens was undertaken as an alternate to the 48 in. f/4.0 lens. (Author)

AD-600 122 Div. 24
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
AN OPTICAL DEVICE WHICH COMPENSATES FOR LINEAR SHIFT IN PANORAMIC STRIP AERIAL PHOTOGRAPHY WITH HORIZONTAL SCANNING AXIS,
by I. V. Kal'berg and Yu. K. Yutsevich. 24 Mar 64, 5p.
FTD TT63 1005; TT 64 11652
Unclassified report

Unedited rough draft trans. of Russian patent no. 132951 (appl. no. 654403/26) 15 Feb 60.

Descriptors: (*Aerial cameras, Optical equipment components), (*Optical equipment components, Aerial cameras), Aerial photography, Photographic equipment, Wedges, Panoramic cameras.

This optical device which compensates for linear shift in panoramic strip aerial photography with horizontal scanning axis, contains a double wedged optical compensator with the wedge angles corresponding to the compensation velocity. To compensate for the variable image velocity, the compensator rotates in front of the objective at the same velocity as the projected pencil of rays. (Author)

AD-600 295 Div. 24
OTS price $1.50

Houston-Fearless Div., Color Corp. of America, Los Angeles, Calif.
CONTRAST MODULATION TECHNIQUES FOR IMAGE ENHANCEMENT.
Rept. for 12 Mar 62-13 June 63,
by J. Hannum, N. Taylor, J. Davis and W. Birkner. Mar 64, 53p.
Contract AF33 657 8443, Proj. 6237, Task 623702
AFSC TDR64 45 Unclassified report

Descriptors: (*Photographic images, Image intensifiers (Electronics)), (*Image intensifiers (Electronics), Photographic images), Aerial photography, Photographic contrast, Optical scanning, Light, Modulation, Circuits, Cathode ray tubes, Photomultipliers.

A program was undertaken to find a better way to interpret information recorded on a silver-halide photographic emulsion. The information of major interest was that which was below the threshold of human vision, being obscured because of low density differences caused by improper exposure or other effects. The proposed program of research and development consisted of three basic parts: a study of enhancement techniques in general, a design study of the instrumentation techniques required to achieve the most promising enhancement principles, and the fabrication of the necessary laboratory apparatus to demonstrate these techniques. (Author)

AD-600 714 Div. 24, 8, 26
OTS price $8.10

National Cash Register Co., Dayton, Ohio.
HIGH RESOLUTION RAPIDLY PROGRAMMABLE MASKING FOR FUNCTIONAL ELECTRONIC BLOCKS.
Interim engineering rept.,
by Mark Sobottke, Richard Cady, Clifford Kruer and Laurence Brownsey. 10 May 64, 82p. NCR28 21
Contract AF33 615 1158, Proj. 4159, Task 415906
Unclassified report

Descriptors: (*Molecular electronics, Photoengraving), (*Photoengraving, Molecular electronics), Metal plates, Photographic plates, Positioning devices (Machinery), Servomechanisms, Automation, Optical equipment, Cameras.

The objective of this program is to provide new low-cost programmable maskmaker of high resolution. A study and investigation phase, in progress, includes the areas of maskmaking requirements, positioning systems, and optical techniques. The study and investigation to date has defined masking requirements, maskmaker specifications, and programmable maskmaker systems. Currently, a limited engineering model of a programmable maskmaker is being designed and fabricated. (See also AD-431 292) (Author)

)0 082 Div. 25
OTS price $.75

Brown Univ., Providence, R. I.
STRESS CONCENTRATION IN NON-LINEAR CREEP OF A SIMPLE SHELL.
Technical rept. no. 36,
by C. R. Calladine. Dec 63, 21p.
Contract Nonr56220, Proj. NR064 424
Unclassified report

Descriptors: (*Structural shells, Creep), (*Stresses, Cylindrical bodies), Loading (Mechanics), Shear stresses, Plasticity, Nonlinear systems, Pressure vessels, Submarine hulls.

A long thin circular cylindrical shell is loaded at one edge by symmetrical radial shear Q sub x and bending moment M sub x (no interior pressure). The shell is made of material which under applied stress creeps with a strain rate which is proportional to the rth power of the stress. Previous results are used to derive, approximately, the greatest stress in the shell for any Q sub x, M sub x and r. It is shown that for any edge load the greatest stress decreases as r increases, and is approximately a linear function of 1/r. The case r = 1 is exactly analogous to a linear elastic problem, and the case r approaches infinity corresponds exactly to a perfectly plastic problem: results for any exponent r may thus be found approximately by simple interpolation between results obtained in linear-elastic analysis and perfectly plastic analysis. (See also AD-429 287). (Author)

AD-600 089 Div. 25
OTS price $.50

Westinghouse Research Labs., Pittsburgh, Pa.
PARAMAGNETIC RELAXATION IN CRYSTALS.
Final rept., 15 May 62-31 Oct 63,
by J. G. Castle, Jr. and D. W. Feldman. 1964, 14p. WRL
Contract AF19 628 1640, Proj. 4608, Task 46081
AFCRL 64 307 Unclassified report

Descriptors: (*Crystals, Magnetic properties), (*Magnetism, Relaxation time), Paramagnetic resonance, Crystallography.

Several studies of paramagnetic relaxation in crystals were carried out. The results include: (1) Extension of the experimental technique to narrow lines (about 50 millioersteds wide) and to very wide lines (more than 1000 gauss) and to very long relaxation times (many hours). (2) Discovery of a novel temperature dependence of the spin-lattice relaxation time (approximately T(3-)). (3) An attempted extension of relaxation theory relating the T(3-) effect to low-frequency mechanical resonances at the defect sites. (4) Establishment of the spin-lattice relaxation time intrinsic to the F-center in KCl by observing its dependence on temperature from 2.1 to 250 K and on magnetic field from 300 to 10,000 oersted to be independent of concentration in samples prepared in 'our best way.' (5) Fitting the theory of T sub 1 for F-centers to a physical model involving only magnetic hyperfine coupling. (6) Observation and preliminary identification of the strange, asymmetric shape of the paramagnetic resonance absorption due to Ti(+3) ions in corundum. (7) Observation of the T sub 1 of some of the Ti(+3) ions (those ions having g = 1.0 with H parallel to the c-axis) in corundum and identification by its temperature dependence of the energy of the lowest lying excited state as being 52 K. (Author)

AD-600 125 Div. 25, 15
OTS price $3.00

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DISTORTIONS AND STRESSES OF PARABOLOIDAL SURFACE STRUCTURES, PART IV,
by J. W. Mar and F. Y. M. Wan. 29 Apr 64, 160p.
LL71G1P4
Contract AF19 628 500
ESD TDR64 55 Unclassified report

Descriptors: (*Structural shells, Parabolic bodies), (*Parabolic bodies, Structural shells), Surface area, Loading (Mechanics), Shear stresses, Gravity, Numerical analysis, Integration, Series, Differential equations, Vector analysis.

The present report is the fourth part of a series bearing the general title of 'Distortions and Stresses of Paraboloidal Surface Structures.' Asymptotic integration methods are used to obtain solutions for shells which are deeper than those treated in Part III (AD-417 081). A large number of specific configurations has been analyzed and the numerical results are presented in the form of dimensionless plots. The discussion is focused on the deformation behavior under gravity loads as it is affected by the span of the shell, the direction of the gravity vector, and the boundary conditions. There are also contour plots of deflections relative to the face-up position which depict the change in the shapes of the paraboloidal surface as the direction of the gravity vector is changed. (Author)

AD-600 130 Div. 25
OTS price $.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
INVESTIGATION OF THE TEMPERATURE FIELD IN AN ASSYMETRICALLY HEATED SANDWICH PLATE WITH A HONEYCOMB CORE,
by M. S. Povarnitsyn. 22 Apr 64, 12p.
RSIC 169; TT 64 11645
Unclassified report

Trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) 1961, v. 4, no. 10, p. 64-70.

Descriptors: (*Sandwich panels, Thermodynamics), (*Honeycomb cores, Sandwich panels), Heating, Heat transfer, Equations, Mathematical analysis.

The problem of the asymmetrical kinetic heating of a sandwich plate with honeycomb core is considered. Heat transfer in the plate is due to thermal conduction and cross radiation. A formula for effective thermal conduction is obtained. A simple solution of the problem is proposed for the case where the temperature of the outer surfaces of the plate has only a slight relation to the coordinates. (Author)

AD-600 131 Div. 25
OTS price $.75

Westinghouse Research Labs., Pittsburgh, Pa.
PARAMAGNETIC RELAXATION IN CRYSTALS.
Final rept., 15 Apr 59-14 May 62,
by J. G. Castle, Jr. and D. W. Feldman. 1964, 22p.
Contract AF19 604 5589, Proj. 5621, Task 56211
AFCRL 64 308 Unclassified report

Descriptors: (*Crystal lattices, Paramagnetic resonance), (*Paramagnetic resonance, Relaxation time), Solid state physics, Test methods, Crystal lattice defects, Impurities, Microwave equipment, Abstracts.

25. PHYSICS

AD-600 004 Div. 25, 7
OTS price $2.50

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
LARGE-SIGNAL BEHAVIOR OF A PARAMETRIC MAGNETO-GASDYNAMIC GENERATOR,
by Arthur T. Lewis. Nov 63, 106p.
Contract AF33 616 7624, Proj. 8173, Task 817306 1
RTD TDR63 4132 Unclassified report

Descriptors: (*Electric power production, Magnetohydrodynamics), (*Magnetohydrodynamics, Generators), (*Plasma physics, Electric power production), Signals, Magnetic fields, Gas flow, Velocity, Conductivity, Effectiveness, Plasma oscillations.

The large-signal behavior of a parametric magnetogasdynamic generator consisting of a cylindrical coil with batches of highly conducting plasma traveling along the coil axis is considered. In this limit, the gas behavior is strongly affected by the magnetic forces. The purpose of the work is to determine: (i) whether the requirements for the conductivity and velocity of the gas that are found for small-signal behavior are relaxed because of any enhancing mechanism during the interaction; (ii) what fraction of the gas power could be extracted as useful electrical power, that is, the over-all generator efficiency; (iii) how the interaction between the field and the gas leads to gas behavior that limits the growth of the parametric oscillations so that a stable operating point is reached; (iv) an estimate of the minimum size and power of a generator with present technology; and (v) the factors that control the scaling of the parametric generator. (Author)

AD-600 045 Div. 25, 8
OTS price $2.75

Illinois Univ., Urbana. Engineering Experiment Station.
ELECTRON INTERACTIONS IN CRYOGENIC HELIUM PLASMAS.
Scientific rept. no. 1,
by P. D. Goldan, J. H. Cahn and L. Goldstein.
Dec 63, 139p.
Contract AF19 628 3307, Proj. 4642, Task 464203
AFCRL 64 67 Unclassified report

Descriptors: (*Plasma physics, Beta particle reactions), (*Cryogenics, Helium), (*Helium, Plasma physics), (*Microwaves, Propagation), Electrons, Temperature, Field theory, Electromagnetic probes, Microwave bridges, Waveguides, Masers, Sound, Modulation.

Electron interactions in decaying helium afterglow plasmas, maintained near 5 K, were determined from electronic microwave conductivity measurements. Experiments were performed for neutral densities in the range 2 x 10 to the 17th power 1.2 x 10 to the 19th power atoms/cc. Concurrently, electron temperatures were inferred from microwave noise radiation from the afterglow plasma and microwave interaction measurements. (Author)

AD-600 062 Div. 25, 26
OTS price $1.50

Airtron, Inc., Morris Plains, N. J.
ON THE PREPARATION OF SINGLE CRYSTAL FERRITE MATERIALS BY THE FLOATING ZONE TECHNIQUE.
Final progress rept.,
by Donald A. Lepore and Richard C. Puttbach.
27 Jan 64, 55p. Airtron R11 441
Contract NOrd18020
Unclassified report

Descriptors: (*Single crystals, Ferrites), (*Ferrites, Crystal growth), (*Crystal growth, Ferrites), Magnetite, Garnet, Nickel compounds, Manganese compounds, Magnesium compounds, Aluminum compounds, Yttrium compounds, Iron compounds, Silicon compounds, Carbides, Molybdenum compounds, Silicides, Zirconium compounds, Oxides, Melting, Induction heating, Stability, Pressure.

The growth of single crystal ferrites, by the floating zone technique, was extensively investigated. A pressure vessel, incorporating a floating zone mechanism was constructed; also, appropriate facilities were provided for high frequency induction heating. Investigations into the growth of single crystal ferrite by induction heating were carried out using floating zone, differential pulling, pulling from a self-contained melt, and stable-melt pulling methods. Also, several experiments were conducted to test the feasibility of radiation melting. The principal materials studied using the methods mentioned above were nickel ferrite, magnetite, manganese ferrite, magnesium ferrite, nickel aluminum ferrite, and yttrium iron garnet. Experiments were conducted to determine suitable induction coils, and the effects of oxygen pressures on molten ferrites are considered. Possible causes for low resistivity and broad linewidth data are discussed. (Author)

AD-600 076 Div. 25
OTS price $2.75

Carlyle Barton Lab., Johns Hopkins Univ., Baltimore, Md.
THE MAGNETIC FIELD DEPENDENCE OF PARAMAGNETIC RELAXATION IN A KRAMERS SALT AT LOW TEMPERATURES.
Technical rept.,
by D. A. Davids. May 64, 128p. Rept. no. AF107
Contract AF33 657 11029, Proj. 4036, Task 403601
Unclassified report

Descriptors: (*Paramagnetic materials, Salts), (*Paramagnetic resonance, Relaxation time), Microwave spectroscopy, Iron, Potassium compounds, Iron compounds, Cyanides, Crystals, Phonons, Microwave spectroscopy, Magnetic fields.

Paramagnetic relaxation rates were measured for iron in dilute potassium ferricyanide at liquid helium temperatures and over a range of static magnetic field strengths covering approximately 1.1-3.6 kilogauss. The relaxation rates were measured by observing the transient behavior of a paramagnetic resonance line following inversion by adiabatic rapid passage. For the conditions under which this experiment was performed, a review of the Kronig-Van Vleck theory of single phonon, or direct, relaxation was shown to yield: 1/T sub 1D = const. (applied mag. field to the 4th power)T. In analyzing the experimental data, the direct relaxation rate was separated from the observed relaxation rate by subtracting the Raman term observed by previous researchers. The results for all but the highest field value showed good agreement with the predicted fourth-power field dependence. At the highest value of the field a marked size effect was noted; however, the results of experiments performed with the smallest sample were shown also to give good agreement with the theory. (Author)

ablation rates for solid spheres of low thermal conductivity and constant thermal properties, subjected to point symmetric aerodynamic heat inputs. A short time solution for the temperature which is valid prior to ablation, is developed by use of Laplace transforms. The ablation solution is derived by approximation of the radial temperature profile by an exponential function and utilization of the heat balance technique. This results in a second-order, nonlinear, ordinary differential equation for the position of the ablating surface. Results of the numerical integration of the approximate solutions are compared with experimental data obtained at the stagnation point of a Plexiglas hemisphere tested under hypersonic flow conditions. A discussion of the techniques employed, as well as the comparison with experimental data, appear in the body of the report. (Author)

AD-600 177 Div. 25, 8
OTS price $1.25

Stanford Electronics Labs., Stanford Univ., Calif.
THE QUANTIZER: AN APPLICATION OF QUANTIZATION OF TRAPPED FLUX IN SUPERCONDUCTORS.
Interim technical rept., Sep 61-Feb 63,
by D. J. Dumin. Dec 63, 47p. SEL63 128, SEL TR 4717 1
Contract AF33 616 7726, Proj. 4159, Task 415904
AL TDR64 28 Unclassified report

Descriptors: (*Superconductors, Quantum mechanics), (*Quantum mechanics, Magnetic fields), Data storage systems, Computers, Circuits, Equations.

The report describes a completely superconducting system for the trapping and detecting of certain quantum values of flux. The quantizer and its operating characteristics are described. Up to six levels of flux were trapped and detected. A short discussion of material properties, speed considerations, and circuit applications is presented. (See also AD-429 051). (Author)

AD-600 178 Div. 25, 8
OTS price $3.00

Purdue Univ., Lafayette, Ind.
PHOTOCONDUCTIVITY OF GALLIUM ANTIMONIDE.
Technical rept. (thesis),
by M. A. Habegger. 1 June 64, 156p.
Contract Nonr1100 04, Proj. NR015 221
Unclassified report

Descriptors: (*Antimony alloys, Photoconductivity), (*Gallium alloys, Photoconductivity), Photoelectric materials, Single crystals, Crystal lattice defects, Excitation, Atomic energy levels, Phonons, Electrons.

The photoconductivity of GaSb was studied to obtain information about impurity or defect levels and to elucidate the recombination processes of excess carriers. The spectral distribution, the steady state magnitude of the response and the transient behavior of the photoconductive signal were studied. Measurements were made in the temperature range of 5 K to 370 K. (Author)

AD-600 182 Div. 25, 12, 17
OTS price $1.50

Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
THE TORSIONAL DAMPING CAPACITY OF A THIN WIRE AND ITS APPLICATION TO THE DAMPING OF A LIBRATING EARTH SATELLITE,
by J. F. Smola, Paul R. Schrantz and B. E. Tossman. Aug 63, 52p. CM1039
Contract NOw62 0604c
Unclassified report

Descriptors: (*Satellites (Artificial), Damping), (*Wire, Helical springs), Springs, Beryllium alloys, Copper alloys, Plating, Cadmium, Oscillation, Stresses, Internal friction, Creep, Viscosity, Grain boundaries, Strain (Mechanics).

A method that has been used effectively to damp a librating gravity gradient stabilized earth satellite is described. The device consists of an extremely weak beryllium-copper helical spring plated with cadmium; this is the primary damping medium. Some of the problems that confronted the experimenters during the development program are discussed, along with the numerous test data that were collected. Currently accepted theories describing the mechanism of the energy dissipation investigated are enumerated and evaluated. (Author)

AD-600 226 Div. 25, 17
OTS price $1.60

Army Engineer Research and Development Labs., Fort Belvoir, Va.
THE PHOTO EFFECT IN COLLOIDAL METAL PARTICLES,
by I. M. Dykman. 1964, 12p.
AERDL T1721, TT 64 15584
Unclassified report

Trans. of Akademiya Nauk URSR Kiev. Instytut Fizyky. Trudy, 1954, vol. 5, p. 94-104.

Descriptors: (*Photoelectric effect, Metals), (*Metals, Photoelectric effect), Cathodes, Atomic energy levels, Particles, Colloids, Metal films, Electrons, Absorption, USSR.

The conclusion was drawn that the photo effect is uniquely dependent on the frequency of the light and the size of the object. This dependence is qualitatively different from the characteristics of massive metal cathodes. The reason for this is not hard to find. The absorption of light of a given frequency by the conduction electrons of the metal depends to a considerable extent on the position of the starting energy level. A small change in the latter is sufficient to produce a sharp variation in the probability of absorption of the light. In spite of the fact that an increase in the size of the irradiated objective is accompanied by an increase in the number of levels, their position may be such that none conditions a significant absorption of light, and hence a significant photocurrent, at the given frequency. Conversely, if the object is small, there may be only a single level from which light of the given frequency can transfer electrons to the continuous spectrum, but the probability of such a process may be quite high. (Author)

AD-600 233 Div. 25, 17
OTS price $1.00

Lessells and Associates, Inc., Waltham, Mass.
ACOUSTIC EMISSION UNDER APPLIED STRESS.
Rept. for 15 Apr 63-14 Apr 64,
by B. H. Schofield. May 64, 36p.
Contract AF33 657 8562, Proj. 7360, Task 736002
ASD TDR63 509 P2 Unclassified report

Descriptors: (*Single crystals, Gold), (*Gold, Acoustic properties), (*Metallic crystals, Acoustic properties), Acoustics, Surfaces,

Progress made in an effort on the study of paramagnetic relaxation of fixed centers in crystals is outlined. The principal results were: (1) Development of an accurate method for measuring paramagnetic relaxation; (2) The demonstration of this technique in a variety of cases of interest to solid-state physics and related technology; (3) A significant contribution to the theory of paramagnetic relaxation and to the understanding of the coupling to the lattice of impurity ions and of other defect centers; (4) Improvement in the basic understanding of each of a variety of center and host combinations; and (5) Development of several novel microwave components. The essence of the research information is contained in the thirteen scientific reports whose abstracts appear as appendices to the report. (See also AD-284 393). (Author)

AD-600 136 Div. 25, 15
OTS price $3.60

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PROOF OF THE THEOREM OF A. N. KOLMOGOROV CONCERNING THE CONSERVATION OF CONDITIONALLY PERIODIC MOTIONS WITH SMALL CHANGE OF THE HAMILTONIAN FUNCTION,
by V. I. Arnol'd. 7 May 64, 39p.
FTD MT64 174; TT 64 15691
Unclassified report

Edited machine trans. of Uspekhi Matematicheskikh Nauk (USSR) 1963, v. 18, no. 5(113) p. 13-40.

Descriptors: (*Mechanics, Perturbation theory), (*Hamiltonian, Differential equations), (*Differential geometry, Theorems), Transformations (Mathematics), Sequences.

AD-600 149 Div. 25
OTS price $.50

Midwest Research Inst., Kansas City, Mo.
THE STRUCTURE AND STRENGTH OF EPITAXIAL FILMS.
Bimonthly progress rept. no. 3, 17 Feb-17 Apr 64. 15 May 64, 12p.
Contract NOw64 0061d, M.R.I. Proj. 2742P
Unclassified report

Descriptors: (*Epitaxial growth, Films), (*Films, Single crystals), (*Vacuum equipment, Construction), Single crystals, Crystal growth, Test equipment, Vacuum apparatus, Laboratory furnaces, Strain (Mechanics), Silver.

Most of the experimental equipment, designed for deposition and evaluation of epitaxial films on single crystal substrates, has been assembled. Discussions and photographs of the evaporation oven, substrate holder, vacuum system, and stress mechanism are presented. Brief reviews are given on the design of a strain measuring system and of plans for future work. (Author)

AD-600 158 Div. 25
OTS price $.50

Naval Radiological Defense Lab., San Francisco, Calif.
A SIMPLE DISPLAY SYSTEM FOR RECORDING RAPID CHANGES IN MASS SPECTRA,
by Kenneth A. Lincoln. 17 Mar 64, 18p.
NRDL TR731; DASA 1453
Unclassified report

Descriptors: (*Mass spectroscopy, Display systems), (*Spectrum analyzers, Photographic recording systems), Display systems, Oscilloscopes, Spectrum analyzers, Cameras, Xenon lamps.

A convenient photographic readout for recording rapidly changing mass spectra (of the order of milliseconds) generated by a time-of-flight instrument is achieved by a combination of two oscilloscopes equipped with Polaroid Land cameras One of the oscilloscopes is operated by established techniques to display, quantitatively, peak height versus time for any one of the preselected mass peaks. Simultaneously, the second oscilloscope in the system displays a raster presentation of approximatepeak height of all the peaks in the spectrum as afunction of time. In the latter case, the discrete m/e values are displayed on the horizontal axis as dots and the magnitude of the ion peaks is displayed semiquantitatively by z-axis modulation (intensification of the dots), while time is presented as the trace is displaced vertically by a raster voltage which is synchronized with the time base of the first scope. The z-axis circuitry has been employed to further advantage by applying it to the monitoring oscilloscope during the customary time-of-flight spectral presentation (ion-peak height versus m/e) to intensify all the peaks of the oscilloscopic display, thus enhancing visual observation and photographic recording for all operations of the mass spectrometer. The system is described, and several applications to the rapid analysis of gaseous products resulting from the millisecond-duration flash pyrolysis of polymers are presented. (Author)

AD-600 159 Div. 25
OTS price $.50

Naval Radiological Defense Lab., San Francisco, Calif.
FLASH VAPORIZATION OF SOLID MATERIALS FOR MASS SPECTROMETRY BY INTENSE THERMAL RADIATION,
by K. A. Lincoln. 24 Mar 64, 12p.
NRDL TR736; DASA 1468
Unclassified report

Descriptors: (*Mass spectroscopy, Solids), (*Vaporization, Solids), Spectrum analyzers, Xenon lamps, Metals, Polymers, Thermal radiation, Ionization potentials.

Mass spectra of low vapor pressure materials, such as polymers and metals, were obtained by the technique of flash-vaporization mass spectrometry. Single, thermal pulses from a xenon flashtube vaporize the samples directly into the ion source of a time-of-flight mass spectrometer; the mass spectra appear momentarily on the screen of an oscilloscope and are recorded photographically. This technique, which also renders some short-lived species amenable to mass spectrometric studies, and the apparatus (including vacuum lock for introducing solid samples into the instrument) are described. (Author)

AD-600 173 Div. 25, 9, 12
OTS price $1.00

Polytechnic Inst. of Brooklyn, N. Y.
ABLATION OF A SOLID SPHERE OF A LOW CONDUCTIVITY MATERIAL,
by Richard F. Parisse. Apr 64, 32p. PIBAL683
Contract Nonr839 23, Proj. NR064 433
Unclassified report

Descriptors: (*Ablation, Re-entry vehicles), (*Aerodynamic heating, Re-entry vehicles), (*Heat shields, Ablation), Heat of sublimation, Thermal conductivity, Differential equations, Acrylic resins, Spheres, Hypersonic wind tunnels, Solids.

An approximate solution is presented for determining transient temperature distributions and

AD-600 267 Div. 25
OTS price $.75

Hughes Research Labs., Malibu, Calif.
LASER DEVICES EXPLORATORY INVESTIGATION.
Interim engineering rept. no. 4, 3 Feb-30 Apr 64,
by H. V. Winston. 30 Apr 64, 22p.
Contract AF33 657 11650
Unclassified report

Descriptors: (*Lasers, Design), (*Lasers, Materials), Optical equipment components, Sapphires, Ruby, Single crystals, Crystal growth, Lanthanum compounds, Fluorides, Gadolinium compounds, Oxides, Impurities, Promethium, Chromium, Europium, Samarium, Raman spectroscopy, Microwave spectroscopy.

The fabrication and testing of sapphire quarter-wave plates for use with ruby in a novel longitudinal mode selector were completed. Testing of the elliptical pumping cavity for cw operation was begun. A new setup made possible the growth of doped lanthanum trifluoride crystals of relatively high quality. Flame fusion techniques were used to make single crystal Gd2O3. The optical spectra of the newly grown LaF3:Pr(3+) and Gd2O3 (which contained europium and samarium impurities) were obtained. Microwave spectra of chromium-doped LaF3 were observed, and work continued on the identification of the resonances observed in terbium-doped LaF3. Anomalies in the emission angles of anti-Stokes cones from various stimulated Raman scattering (SRS) materials were measured, and possible explanations examined experimentally. The most recent measurements show that both Stokes and anti-Stokes cones in typical SRS materials have angle spreads greater than 1 degree and wavelength spreads of the order of 20 Angstrom units. (See also AD-429 856). (Author)

AD-600 275 Div. 25, 4, 20
OTS price $1.00

Anti-Submarine Warfare Lab., Naval Air Development Center, Johnsville, Pa.
SPIN ECHOES IN MAGNETIC RESONANCE.
Foundational Research Program Phase rept.,
by G. Thomas Moore. 17 Apr 64, 36p.
Task FR30304
NADC AW 6332 Unclassified report

Descriptors: (*Nuclear magnetic resonance, Theory), (*Nuclear spins, Nuclear magnetic resonance), Radiofrequency pulses, Resonance, Relaxation time, Measurement.

The report reviews the general theory of nuclear magnetic resonance with particular emphasis on the theory, methods, and techniques of pulsed resonance systems. Descriptions are given of the response of nuclear spins to 1, 2, 3, and multi-pulse arrays relating each to the mathematical development of E. L. Hahn, 1950. Included are oscilloscope pictures of typical examples of the various pulse and echo arrangements illustrating their use in measuring relaxation times (spin-spin and spin-lattice). (Author)

AD-600 286 Div. 25, 15
OTS price $2.75

Antenna Lab., Ohio State Univ. Research Foundation, Columbus.
TABLES OF THE REGULAR AND LOGARITHMIC COULOMB WAVE FUNCTIONS AND TABLES OF ARG GAMMA (L + I SUB ETA),
by R. DeVore and Shen Lin. 15 Nov 63, 130p.
OSURF1565 4
Contract AF33 657 10426
Unclassified report

Descriptors: (*Functions, Tables), (*Tables, Functions), (*Wave functions, Tables), (*Special functions (Mathematical), Tables), Quantum mechanics.

The regular and logarithmic Coulomb wave functions have been tabulated for an attractive potential from k=0.01 to k=1.00 in steps of 0.02 within the radial range 0.05 < r < 10.0 for the first three angular momentum values. The argument of the gamma function gamma (1 + i sub eta) has been tabulated for the parameter 1, -3 <1 <4, with eta varying from -2.0 to +30.0. (Author)

AD-600 291 Div. 25
OTS price $1.00

Aerospace Information Div., Washington, D. C.
SOVIET ADVANCED LASER PROPOSALS: COMPREHENSIVE REPORT.
Rept. no. 1.
13 May 64, 33p.
AID P64 35; TT 64 15657 Unclassified report

Report on Surveys of Soviet-Bloc Scientific and Technical Literature.

Descriptors: (*Lasers, Scientific research), Amplifiers, Raman spectroscopy, Gamma-ray spectra, Fiber optics, Plasma physics, Organic compounds, Atomic energy levels, USSR, Line spectrum.

A review of Soviet literature is given on controllable lasers based on the Zeeman effect, gamma lasers, fiber-optics lasers, Raman scattering lasers, plasma lasers, chemical lasers, and lasers based on organic materials. (Author)

AD-600 293 Div. 25
OTS price $.75

Mithras, Inc., Cambridge, Mass.
THE ULTRAVIOLET ABSORPTION SPECTRA OF RUBY.
Scientific rept. no. 1,
by Charles S. Naiman and Arthur Linz. Oct 63,
28p. MC62 49R1
Contract AF19 628 2395, Proj. 5621, Task 562104
AFCRL 63 581 Unclassified report

Descriptors: (*Lasers, Ruby), (*Ruby, Ultraviolet spectroscopy), (*Ruby, Absorption spectrum), Crystal structure, Crystals, Impurities, Fluorescence, Excitation, Atomic energy levels.

The ultraviolet absorption spectra of ruby were studied in absorption and fluorescence. Measurements were performed on heavily doped rubies of up to 4.3 percent Cr. This data was correlated with excited state absorption experiments performed on the long lived 2E level. The spectra are assigned on the basis of the simple crystal field theory, taking into account intensities and polarizations. The charge transfer spectrum of Cr(3+)(d3) in Al2O3 is also discussed. Evidence is found of spin forbidden bands (doublets) borrowing intensity from charge transfer spectra. This probably explains the origin and intensity of the so-called 'forbidden charge transfer bands' from 40,000/cm to 50,000/cm in ruby. Discussed in brief are details of the spectra, such as the trigonal field splitting, vibrational structure, and the 'pair bands' at about 28,000/cm to 30,000/cm, discovered by Linz and Newnham. A number of possible explanations of

Thin films, Oxides, Crystal lattice defects, Stresses, Strain (Mechanics), Loading (Mechanics), Deformation, Heat treatment.

Studies were made to assess the role of the surface and surface films in the generation of acoustic pulses, i.e., acoustic emission of metals. Experiments were conducted on single crystals of pure gold of varying crystallographic orientation. Specific crystallographic orientations were chosen to evaluate the effect of screw and edge dislocation mobility separately. Specimens were deformed in tension in ambient atmosphere. Results indicate that the surface and its condition play a minor role in the generation of the acoustic pulses; the phenomenon being related to the volumetric condition. Specific observations suggest the development of structural faults during deformation, reminiscent of elemental twins. Emission characteristics peculiar to gold are discussed for the several experiments. (See also AD-419 177). (Author)

AD-600 256 Div. 25, 17
OTS price $2.60

Battelle Memorial Inst., Columbus, Ohio.
EFFECTS OF PLASTIC DEFORMATION, ANNEALING, AND FATIGUE ON THE ELECTRICAL PROPERTIES OF INDIUM ANTIMONIDE.
Final rept., 1 Apr 56-31 Mar 64,
by J. J. Duga and A. H. Clauer. 15 May 64, 24p.
Contract Nonr1870 00, Proj. NR023 462
Unclassified report

Descriptors: (*Semiconductors, Electrical properties), (*Indium alloys, Antimony alloys), (*Antimony alloys, Indium alloys), Deformation, Plasticity, Heat treatment, Fatigue (Mechanics), Crystal lattice defects, Transport properties, Metallography.

The project was concerned with the effects of plastic deformation, annealing, and fatigue on the electrical properties of the semiconductor indium antimonide. It was anticipated that the large carrier mobilities observed in n-type indium antimonide and the correspondingly large sensitivity to lattice defects could be used as a tool for investigating the effects of lattice disregistry, point defects, dislocations, etc., and to analyze the transport properties in terms of the mechanisms of defect generation and interaction. It was then, also, the purpose of the basic research program to attempt to establish guidelines whereby an understanding of the mechanisms of fatigue might follow. Each of the original objectives was either followed through to the solution of specific problems, or has at least provided a model upon which one may build for more detailed study. (See also PB-159 350). (Author)

AD-600 264 Div. 25
OTS price $.75

Bausch and Lomb, Inc., Rochester, N. Y.
INFRARED COATING STUDIES.
Final quarterly rept., 15 Dec 63-15 Mar 64.
15 Mar 64, 23p.
Contract DA44 009AMC124T
Unclassified report

Descriptors: (*Infrared optical materials, Reflection), (*Infrared filters, Refractive index), Lead compounds, Chlorides, Zinc compounds, Tellurides, Lithium compounds, Fluorides, Crystals, Films, Coatings, Adhesion, Optical properties, Vapor plating.

The report deals with the experimentally determined refractive indices of films of lead chloride and zinc telluride, and with the reflectance enhancement of the reststrahlen of films and crystals of lithium fluoride by means of single layers of zinc telluride. After a section on miscellaneous experimental observations of the adherence of certain infrared films and substrates, the report concludes with a short summary of the year's work. (See also AD-429 240). (Author)

AD-600 265 Div. 25
OTS price $5.60

Laboratoire de Physique Theorique at Hautes Energies, Orsay (France).
NON LOCAL QUANTUM ELECTRODYNAMICS,
by Maurice Levy. Dec 63, 53p. Th38 11
Grant AF EOAR63 47
Unclassified report

Descriptors: (*Field theory, Photons), (*Quantum mechanics, Electromagnetic fields), (*Photons, Quantum mechanics), Charged particles, Particle trajectories, Perturbation theory, Integration, Operators (Mathematics), Invariance, Polarization, Matrix algebra.

A gauge invariant non-local form of quantum electrodynamics is constructed by introducing, in the interaction Lagrangian, averages of the Dirac field operators over time-like paths. It is shown that this theory leads to convergent results to every order of perturbation theory. Observable quantities are averaged subsequently over all possible time-like paths. The theory contains a finite renormalization of the photon mass which does not conflict with gauge invariance. The experimental requirement that the physical mass of the photon should vanish corresponds to an additional condition to be imposed to the parameters of the theory. (Author)

AD-600 266 Div. 25
OTS price $1.60

Laboratoire de Physique Theorique et Hautes Energies, Orsay (France).
ON THE COLLECTIVE VIBRATIONS OF A MANY-FERMION SYSTEM.
by B. Jancovici and D. H. Schiff. Feb 64, 14p.
Th42
Grant AF EOAR63 47
Unclassified report

Descriptors: (*Fermions, Vibration), (*Field theory, Fermions), (*Quantum mechanics, Fermions), Particles, Energy, Numerical analysis, Special functions (Mathematical), Integral equations, N-body problem.

The energy levels of a many-fermion system are investigated through an extension of the generator coordinate method of Peierls-Yoccoz and Wheeler-Griffin. A trial wave function for the system is taken as a superposition of all possible independent particle wave functions in the neighborhood of the Hartree-Fock ground state wave function; the functions depend on many parameters. An integral equation is established for the generator function. Through appropriate approximations, this integral equation is transformed into the Schrodinger equation for a set of coupled harmonic oscillators, which can be solved. The energies and wave functions are obtained for the ground state and the low excited states of the system. The present approach is equivalent to the random phase approximation. (Author)

Descriptors: (*Dielectrics, Continuum mechanics), (*Continuum mechanics, Dielectrics), Field theory, Deformation, Electromagnetic fields, Stresses, Quadrupole moments, Integral equations, Entropy, Mechanical waves, Elasticity, Shear stresses.

Basic axioms of the theory of continuous media are employed to obtain the field equations, jump conditions, and constitutive equations of a polar elastic dielectric subject to large deformations and electromagnetic fields. The theory is dynamical and includes such polar effects as stress moments and electric quadrupole moments. Electromechanical interaction forces and their energies are calculated by assuming a distributed Lorentz force on the bound charges within the volume element. The conservation of mass, balance of momenta, conservation of energy, Faraday's, Ampere's and Gauss' laws are then postulated in integral form, from which the field equations and jump conditions are obtained systematically. An equation of entropy production is given which is used to derive a nondissipative constitutive theory. For the dissipative system there is given a properly invariant second order constitutive theory with its special forms. (See also AD-412 690) (Author)

AD-600 374 Div. 25, 15
OTS price $28.50

Geophysics Corp. of America, Bedford, Mass.
CALCULATIONS OF WAVE FUNCTIONS AND TRANSITION PROBABILITIES.
Final rept.,
by Ali M. Nagvi and George A. Victor. Mar 64, 631p.
Contract AF29 601 5676, Proj. 7811, DASA 07 003, Task 781101
RTD TDR63 3118 Unclassified report

Descriptors: (*Wave function, Quantum mechanics), (*Quantum mechanics, Probability), (*Atomic orbitals, Momentum), Electrons, Integrals, Numerical analysis, Calculus of variations, Nuclear properties.

Analytic expressions for the Slater integrals Fk and Gk are derived using the screened hydrogenic orbitals. The Slater integrals in this form are functions of the principal and the orbital angular momentum quantum numbers of the two electrons, and also the scaled (or effective) nuclear charges for the two electrons. Expressions are also derived for the partial derivatives of the Slater integrals. The functional dependence of the Slater integrals and their partial derivative upon the quantum numbers and the scaled nuclear charges is partially separated, which makes it especially convenient to use them in a machine program for calculating the screening parameters. The Slater integrals and their partial derivatives are evaluated for numerous cases of interest (up to n = 9). The calculations of the screening parameters for many-electron atoms, based on Layzer's variational theory, are described. Total energies, excited-state energies, ionization potentials, spin-orbit integrals, and transition integrals have been calculated for numerous atomic systems using screened hydrogenic orbitals. (Author)

AD-600 389 Div. 25, 4
OTS price $.50

Basel Univ. (Switzerland).
ANALYSIS OF THE SPECTRUM OF THE NITRIC OXIDE MOLECULE.
Scientific rept.,
by E. Miescher. Mar 64, 5p.
Grant AF EOAR63 109
AFCRL 64 391 Unclassified report

Descriptors: (*Nitrogen compounds, Oxides), (*Oxides, Nitrogen compounds), (*Absorption spectrum, Analysis), Molecular spectroscopy, Excitation, Isotopes.

Progress in the analysis of the NO- absorption spectrum is reported. Three isotopes of the molecule are studied. New energy levels and their interactions are discussed. (Author)

AD-600 413 Div. 25, 2, 15, 19
OTS price $1.25

RAND Corp., Santa Monica, Calif.
A BASIC APPROACH TO THE USE OF CANONOCAL VARIABLES AND VON ZEIPEL'S METHOD IN PERTURBATION THEORY,
by J. H. Hutcheson. May 64, 49p. RM4074PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Perturbation theory), (*Differential equations, Numerical analysis), (*Transformations (Mathematics), (*Celestial mechanics), Celestial navigation, Space flight, Guidance.

This study was concerned with the von Zeipel perturbation method for finding an approximate solution to differential equations such as occur in non-linear mechanics. The method is illustrated by briefly introducing some fundamental principles of Hamilton-Jacobi mechanics relating to the formation of the Hamiltonian, canonic equations, canonic variables, transformations, etc. The von Zeipel method consists of making successive mathematical transformations of variables of a canonical system of differential equations. The transformations are performed in a methodical way according to established general rules so that the final solution is obtained in a certain desired form. Two examples are worked out in detail, one is for the non-linear spring equation where energy is conserved and the other is for the Van der Pol equation to illustrate how an energy-dissipating system is handled. Also there is a discussion of some basic principles and details regarding the variation of parameters method and finally, a comparison is made of the von Zeipel method with that of Kryloff-Bogoliuboff (which is widely applied in the fields of engineering and physics). (Author)

AD-600 419 Div. 25
OTS price $.75

Texas Instruments, Inc., Dallas.
SOLID-STATE TECHNIQUES FOR MODULATION AND DEMODULATION OF OPTICAL WAVES.
Quarterly progress rept. no. 2, 1 Oct-30 Dec 63. 1 Feb 64, 28p. TII U2 802400 2
Contract DA36 039AMC03250E, continuation of Contract DA36 039sc89221, Proj. 3A99 21 001
Unclassified report

Descriptors: (*Light, Modulation), (*Light, Demodulation), (*Solid state physics, Optical phenomena), Electron optics, Materials, Copper compounds, Chlorides, Organic compounds, Avalanche diodes, Signal-to-noise ratio.

MODULATION: A fairly detailed investigation of certain cubic electro-optic materials is presently underway. Studies on cuprous chloride and hexamethylene-tetramine have been initiated thus far. These materials have Pockel's coefficients with magnitudes comparable to KDP and further may be operated with the applied electric field oriented transverse to the light path. DEMODULATION: A large signal gain effect at avalanche breakdown voltage was observed in both planar and mesa silicon photodiodes. A signal-to-noise

the latter are put forward in terms of similar spectra observed in ((HN3)5Cr - O - Cr (HN3)5) (4+), or the Pr Cl3 fluorescence studied by Varsanyi and Dieke. Finally, the relevance of the work to the operation of ruby optical masers is touched upon. Specifically, some unique harmonic experiments are suggested. (Author)

AD-600 311 Div. 25
OTS price $3.00

California Univ., Los Angeles.
MASS SPECTROMETER STUDIES OF IONIZATION PROCESSES IN NITROGEN.
Scientific rept. no. 1,
by D. D. Briglia. 1964, 161p.
Contract AF19 628 273 Projs. 8605; 7635, Tasks 860504; 7635
AFCRL 64 259 Unclassified report

Descriptors: (*Mass spectroscopy, Gas ionization), (*Gas ionization, Nitrogen), Nitrogen, Plasma physics, Ions, Electron bombardment, Ionization, Transport properties, Life expectancy, Recombination reactions.

The phenomenon of spontaneous ionization in nitrogen is discussed and the auroral afterglow is attributed to this process. The ions which are extracted from the nitrogen plasma afterglow were analyzed with an electric quadrupole mass spectrometer. The mass spectrometer measurements were supplemented by r.f. absorption studies. It is concluded that the precursor event in the afterglow is the production of free electrons and ions. The observed afterglow light is a result of rapid ion-neutral and ion-electron collisions.

AD-600 321 Div. 25
OTS price $.75

General Mills, Inc., Minneapolis, Minn.
ELECTRICAL CHARACTERISTICS OF GRAIN BOUNDARIES IN COMPOUND SEMICONDUCTORS.
Final rept.,
by R. K. Mueller. 28 June 63, 21p. GMI2404
Contract AF49 638 628
Unclassified report

Descriptors: (*Semiconductors, Grain boundaries), (*Grain boundaries, Semiconductors), (*Grain boundaries, Electrical properties), (*Crystal lattice defects, Grain boundaries), Single crystals, Crystal growth, Purification, Indium alloys, Antimony alloys.

The principal effort was directed toward the preparation of low-angle grain boundaries in indium antimonide (InSb) and the study of their electrical and galvanomagnetic properties with the ultimate objective of relating these properties to the structure of the boundary. (Author)

AD-600 322 Div. 25
OTS price $2.50

Laboratory for Atmospheric and Space Physics, Univ. of Colorado, Boulder.
THE ABSOLUTE QUANTUM EFFICIENCY OF SODIUM SALICYLATE EXCITED BY EXTREME ULTRAVIOLET LIGHT.
AF Scientific rept. no. 4 and NASA Scientific rept. no. 3, May 62-Apr 64,
by Elmo Cody Bruner, Jr. Apr 64, 104p.
Contracts AF19 628 287, NASr86, Proj. 8627, Task 862703
AFCRL 64 340 Unclassified report

Descriptors: (*Luminescence, Excitation), (*Salicylates, Luminescence), Sodium compounds, Salicyclic acids, Ultraviolet radiation, Spectroscopy, Quantum mechanics.

The absolute quantum efficiency of aged sodium salicylate was measured at selected wavelengths in the extreme ultraviolet. The quantum efficiency was found to be of the order of 42% to 48% at the shorter wavelengths and about 80% at 1216A. The excitation spectrum agrees qualitatively with relative excitation spectra determined by other investigators. The significance of the measurements is discussed in the light of present knowledge of the physical processes responsible for the luminescence. (See also AD-427 095). (Author)

AD-600 325 Div. 25, 20
OTS price $1.10

Army Engineer Research and Development Labs., Fort Belvoir, Va.
A SPECTROMETER FOR ULTRA-SOFT X-RAY RADIATION WITH COMPREHENSIVE REGISTRATION OF RADIATION BY MEANS OF SECONDARY-ELECTRON MULTIPLIERS AND A GEIGER COUNTER,
by A. P. Lukirskii. 1961, 8p.
AERDL T1620; TT 64 15839
Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Fizicheskaya, 1961 (v. 25) no. 8, pp. 913-918.

Descriptors: (*Nuclear radiation spectrometers, X-ray spectroscopy), (*X-ray spectroscopy, Nuclear radiation spectrometers), Radiation measurement systems, Geiger counters, Electron multipliers, Secondary emission, USSR.

AD-600 328 Div. 25
OTS price $1.60

McMaster Univ., Hamilton (Ontario).
INHIBITED DISSOLUTION OF (100) SURFACES OF SINGLE CRYSTALS OF LITHIUM FLUORIDE.
Technical rept. no. 2,
by M. B. Ives and J. T. Plewes. May 64, 16p.
Contract Nonr392500
Unclassified report

Descriptors: (*Single crystals, Lithium compounds), (*Lithium compounds, Fluorides), (*Etched crystals, Solubility), Inhibition, Iron, Ions, Autoradiography, Adsorption, Surfaces, Crystal lattice defects.

A technique is described for the determination of the dissolution rates of (100) lithium fluoride surfaces in dilute aqueous solutions of ferric fluoride. The effect of ferric ion content of the etchant on the rate is found to be constant for ion concentrations substantially in excess of the optimum for the production of smooth-faced square etch pits at dislocations. The results correlate well with recent theories concerning the adsorption of ferric ions during etching. The effect of lithium fluoride undersaturation varies greatly from specimen to specimen and demonstrates the heterogeneous nature of hole nucleation in the close packed surfaces. (See also AD-400 725) (Author)

AD-600 329 Div. 25
OTS price $2.25

Purdue Univ., Lafayette Ind. School of Aeronautical and Engineering Sciences.
A DYNAMICAL THEORY OF POLAR ELASTIC DIELECTRICS.
Technical rept. no. 25,
by Roy C. Dixon and A. Cemal Eringen. Apr 64, 89p.
Contract Nonr1100 23
Unclassified report

IMPERFECT AIR,
by Clark H. Lewis and Charles A. Neel. May 64, 154p.
Contract AF40 600 1000, Proj. VT8002
AEDC TDR64 36 Unclassified report

Descriptors: (*Air, Specific heat), (*Air, Sound), Velocity, Thermodynamics, Molecular properties, Tables, Data.

Specific heat and speed of sound data were computed for imperfect air. The thermodynamic data included the effects of two-body intermolecular forces, and the results were obtained by numerical interpolation and differentiation of the recent data of Hilsenrath and Klein (AD-416 040). Comparisons with previous perfect gas calculations showed small effects in the isentropic exponent gamma sub E and dimensionless speed of sound a/a sub a below one amagat and negligible effects on the specific heat data for all densities up to log rho = 2.2. (Author)

AD-600 473 Div. 25, 8
OTS price $1.10

Avco-Everett Research Lab., Everett, Mass.
USE OF GUARD RING SHIELDS ON NEGATIVELY BIASED LANGMUIR ION COLLECTION CURRENT PROBES,
by G. S. Janes and J. P. Dotson. Apr 64, 6p.
AMP137
Contract AF49 638 659
Unclassified report

Descriptors: (*Plasma physics, Probes (Electromagnetic)), (*Probes (Electromagnetic), Plasma physics), Ionic current, Measurement, Rings.

The note describes a shielded ion collection probe that provides a constant effective ion collection area. It is particularly useful when the plasma properties vary in time or space. (Author)

AD-600 480 Div. 25
OTS price $2.25

Hughes Aircraft Co., Culver City, Calif.
GENERALIZED COHERENCE THEORY.
Scientific rept. no. 3,
by G. O. Young and A. Ksienski. Mar 64, 94p.
Contract AF19 628 333, Proj. 4600, Task 460006
Unclassified report

Descriptors: (*Electromagnetic fields, Theory), (*Electromagnetic fields, Statistical processes), (*Electromagnetic waves), Equations, Statistical functions, Space communication systems, Microwave communication systems, Wave transmission, Communication theory.

Current coherence theory applies primarily to ergodic fields generated by uncontrolled sources. In communications, radar, etc., controlled sources predominate since they are essential to the operation of such systems. Coherence concepts must therefore be extended to include nonstationary, controlled sources. The theory developed in this report applies to any type of process of source. It is shown that the coherence properties of electromagnetic waves bear a direct relationship to their information carrying capacity. Thus a maximum information transfer can only be accomplished by means of a coherent field. The coherence function is defined as a space-and-time averaged correlation function between field strengths at two points in a 4-dimensional space-time domain. The field is defined as 'coherent' when the coherence function is a periodic function of an increment in the space-time coordinates. The field is defined as incoherent when the coherence function is zero. If the coherence function satisfies neither of these conditions, the field is 'partially coherent.' A number of examples are worked out of the coherence properties of monochromatic and polychromatic waves emitted by either point sources or extended objects. The effect of aperture limitation on the coherence properties of the image of the above sources is also investigated. (Author)

AD-600 492 Div. 25
OTS price $1.60

Naval Research Lab., Washington, D. C.
LOCALIZED MODES OF VIBRATIONS IN IONIC CRYSTALS WITH AN ISOTOPIC DEFECT,
by G. S. Zavt and N. N. Kristoffel. 1964, 15p.
NRL Trans970; TT 64 15840
Unclassified report

Lokal'nye Kolebaniya v Ionnykh Kristallakh s Izotopicheskim Defektom; Trans. of Akademiya Nauk Estonskoi SSR (Tallinn). Institut Fiziki i Astronomii. Trudy, 1963, v. 23, p. 3-17.

Descriptors: (*Crystals, Vibration), (*Crystal lattice defects, Equations), Isotope impurities, Sodium compounds, Fluorides, USSR.

An equation for the determination of the frequencies of localized modes of vibrations generated by an isotopic impurity in ionic crystals of NaCl-type is obtained by the Green functions method in harmonic approximation. It is shown that for the build-up of the vibrations of localized modes in lattices with similar values of ion masses, the impurity must be on an average twice lighter than the substituted ion. Dependence of the localized mode frequency on the impurity mass is investigated in detail for NaF. The frequencies of localized modes of vibrations of U-centres of H^- and D^- types for ten ionic lattices have been computed. The results of calculations are in agreement with the experimental data available. (Author)

AD-600 496 Div. 25, 4
OTS price $1.60

Southwest Research Inst., San Antonio, Tex.
MIXED ACIDS ANALYSIS BY NMR.
Rept. no. 14, 1-29 Feb 64,
by William H. Storey, Jr. 29 Feb 64, 18p.
Contract DA23 072AMC45A
Unclassified report

Descriptors: (*Nitric acid, Nuclear spectroscopy), (*Oxides, Nitrogen compounds), Nuclear resonance, Nuclear spins, Nuclear magnetic resonance, Chemical analysis.

Nitrogen-14 signal intensity measurements were taken. From wet chemical analyses, total nitrogen concentrations per unit volume were computed. The high degree of correlation between total nitrogen per unit volume and NSR signal intensities from these samples demonstrates that nitric acid together with oxides of nitrogen are being measured. The random nature of deviations in the correlation plot suggests that the accuracy of NSR in total nitrogen determinations is limited only by the precision to which these measurements can be made. (Author)

AD-600 497 Div. 25, 15
OTS price $4.60

North Carolina State Coll., Raleigh. School of Physical Sciences and Applied Mathematics.
NUMERICAL TREATMENT OF AN INTEGRAL EQUATION ARISING IN A MIXED-BOUNDARY ELASTICITY PROBLEM,

ratio improvement of as high as 13 db was measured at microwave frequencies in L-band region. This effect is believed to be similar to the multiplier phototube gain effect in that a signal amplification in the avalanche region results by collision induced electron multiplication. Near the avalanche breakdown voltage increases in signal strength were observed to be as high as 28 db. The general signal enhancement effect at avalanche breakdown was observed for modulation frequencies ranging all the way from the audio to the microwave range. The highest microwave modulated frequency seen with silicon photodiodes has been with the use of the avalanche effect. This was at a frequency at somewhat in excess of 2 kilomegacycles. (Author)

AD-600 430 Div. 25
OTS price $.75

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
ROTATIONAL EXCITATION OF MOLECULAR IONS BY ELECTRONS.
Technical rept. no. 2,
by D. H. Sampson. May 64, 30p. R64SD31
Contract Nonr418800, Proj. NR061 147
Unclassified report

Descriptors: (*Ionized gases, Perturbation theory), (*Plasma physics, Perturbation theory), (*Quantum mechanics, Plasma physics), Diatomic molecules, Ions, Excitation, Electrons, Field theory.

The first order perturbation theory used by R. C. Stabler to compute the cross section for rotational excitation of homonuclear diatomic molecular ions by electrons is shown to be equivalent to an approximation to the method of distorted waves for which the validity criteria can be specified with more precision. (See also AD-430 219) (Author)

AD-600 452 Div. 25
OTS price $1.25

California Univ., Berkeley.
STEADY DETONATIONS IN GASEOUS OZONE.
Technical rept.,
by R. W. Getzinger, J. Ray Bowen, A. K. Oppenheim and M. Boudart. May 64, 41p. UCB3P
Contract Nonr3623 00, Proj. NR098 038
Unclassified report

Report on Project SQUID. International Symposium on Combustion (10th), Cambridge University, August 1964.

Descriptors: (*Ozone, Detonation waves), (*Detonations, Velocity), Oxygen, Argon, Helium, Gases, Combustion, Shock tubes, Pressure, Theory.

The velocity of steady detonation waves in gaseous ozone has been measured over a wide range of conditions: in tubes of diameter between 1 and 25.4 mm., at initial pressures below 80 and 220 Torr and in mixtures containing from 72.5 to 96.6% ozone in oxygen or argon. The experimental velocities, extrapolated to infinite tube diameter, agree within experimental error with those calculated by the classical theory of Chapman and Jouguet. (Author)

AD-600 454 Div. 25, 2
OTS price $3.50

Antenna Lab., Calif. Inst. of Tech., Pasadena.
ON THE THEORY OF NOISE-LIKE ELECTROMAGNETIC FIELDS OF ARBITRARY SPECTRAL WIDTH.
Technical rept. no. 32,
by Alexander D. Jacobson. June 64, 214p.
Contract AF49 638 1266
AFOSR 64 0804 Unclassified report

Descriptors: (*Radio astronomy), (*Electromagnetic fields, Theory), Dielectrics, Statistical analysis, Polarization, Differential equations, Tensor analysis, Vector analysis, Statistical functions, Green's function, Radio interferometers, Noise (Radio), Radio interference, Sources, Equations.

Attention is restricted to fields whose random fluctuations result exclusively from the chaotic nature of the source. The theory is expressed in terms of the second order moment of the field vector; hence, it is a tensor theory. The principal field quantity, the dyadic field spectral density (DFS), is interpreted from both a statistical and a physical standpoint. In particular, a statistical analysis of partial polarization is presented with the aim of providing a physical interpretation of the polarization of a quasi-monochromatic field. The differential equations that govern the behavior of the DFS are derived in the presence of a source, in a source free region, and in a generalized dielectric medium. Boundary conditions are derived for the DFS at a dielectric interface, at a perfectly conducting interface, and at infinity. The differential equations are integrated for various cases with the aid of the dyadic Green's function. The resulting integral representation for the DFS is employed to analyze an experiment that involves the measurement of a partially polarized, incoherent, discrete radio star by means of a two-element radio interferometer. (Author)

AD-600 456 Div. 25, 10
OTS price $1.00

Louvain Univ. (Belgium).
IONIZATION IN FLAMES AND IDENTIFICATION OF THE NEGATIVE FLAME IONS.
Scientific rept. no. 4,
by A. van Tiggelen. May 64, 40p.
Contract AF61 052 398
ARL 64 104 Unclassified report

Descriptors: (*Flames, Ions), (*Gas ionization, Flames), (*Ions, Electrons), Combustion, Combustion products, Ionization, Mass spectroscopy, Identification.

A summary is given of the most representative actual data concerning the measurement of the chemi-ion concentration in the flame reaction zone, the identification of these ions and the rate of their recombination in the afterburning zone. A few possible processes for their formation are discussed; an estimate of the rate of such process is given. Some relations are derived concerning the most probable values of the ion concentrations in the flame front. Ions were produced in the flame gases by means of electron bombardment. Information is given on the nature of some transitory combustion products in the flame. The identity of the negative ions in the flame was investigated. One conclusion concerns the large concentration of negative ions whose amount is comparable to the amount of positive ions; therefore, it is not true that the electrons are the main negative charge carriers. (See also AD-404 876) (Author)

AD-600 469 Div. 25
OTS price $3.00

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
SPECIFIC HEAT AND SPEED OF SOUND DATA FOR

antenna resonance is suppressed by a series resistor at the base of the antenna. The currents induced on nonresonant structures by transient electromagnetic fields are investigated and their application to a direct measurement of the time sequence of the electromagnetic field is discussed. Signals with a simple and known time dependence such as a unidirectional pulse can be radiated into space if the reflection of current waves at discontinuities of the antenna structure is avoided. In a manner similar to that useful for the absorption of continuous waves in media with a stratified conductivity, it is shown that reflections at discontinuities can be avoided by dipoles with tapered resistive loading. (Author)

AD-600 542 Div. 25
OTS price $1.00

Electron Physics Lab., Univ., of Michigan, Ann Arbor.
ENHANCEMENT OF PLASMA DENSITY IN AN ARC DISCHARGE.
Technical rept. no. 64,
by A. Singh and J. E. Rowe. Feb 64, 32p.
ORA05000 10T
Contract AF33 657 8050, Proj. 4156, Task 415603
Unclassified report

Descriptors: (*Plasma physics, Electron beams), (*Gas discharges, Density), Signals, Magnetic fields, Argon, Microwaves.

The use of an electron beam-plasma interaction scheme for the generation and/or amplification of coherent signals in the millimeter wavelength regime requires the creation of a high density stable plasma. A plasma density of approximately 10 to the 15th power particles/cc is required to produce a plasma resonance frequency of 300 Gc. The density in an arc discharge plasma was increased using mechanical and magnetic constriction methods. A density of 7.5 x 10 to the 14th power particles/cc is realized at a discharge current of 4 amperes in argon. Double Langmuir probe measurements of density and temperature in the plasma are presented for zero and finite magnetic field conditions. (Author)

AD-600 586 Div. 25
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ON THE UTILIZATION OF A HIGH PULSE IN PROTON SOURCES,
by M. D. Gabovich and O. F. Nemets. 24 Apr 64, 13p.
FTD TT64 330; TT 64 11692 Unclassified report

Unedited rough draft trans. of Ukrayins'kyi Fizychnyi Zhurnal (USSR) 1958, v. 3, no. 1, pp. 104-111.

Descriptors: (*Plasma physics, Protons), (*Ion sources, Protons), Gas discharges, Ions, Ionic current, USSR.

The possibility of using a powerful pulsed arc, originating during the transition from the Penning to the Keller type discharge, as a powerful pulsed ion source, was investigated. It was shown that at discharge currents of up to 200 a the extracted ion currents exceed 30 ma, and the density of the extracted ion current in the out let opening exceeds 4 a/sq cm. It was shown that the obtainment of reprodicible ion pulses of rectangular form and low modulation is possible. For the first time (in 1950) was established the growth of the proton content with the rise of the discharge current of the arc, reaching 85 to 90% under conditions of a metallic chamber. The device was used for pulsed entry of hydrogen. (Author)

AD-600 607 Div. 25
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EFFECT OF COULOMB INTERACTION OF ELECTRONS WITH IONS ON THE OPTIMUM COMPOSITION OF A GASEOUS MIXTURE,
by E. P. Zimin and V. A. Popov. 11 May 64, 7p.
FTD TT64 441; TT 64 11697
Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) 1963, no. 4, pp. 112-114.

Descriptors: (*Plasma media, Optimization), Gas ionization, Electrons, Elastic scattering, Transformations, Gases, Mixtures, Argon, Cesium, Electrical conductance, USSR.

AD-600 614 Div. 25, 2
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EQUATION OF STATE FOR SOLID BODIES,
by B. I. Davydov. 23 Mar 64, 16p.
FTD TT63 1113; TT 64 11704 Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Geofizicheska(ya) 1956, no. 12, p. 1411-1418.

Descriptors: (*Equations of state, Solid state physics), (*Crystals, Equations of state), (*Metals, Equations of state), (*Minerals, Equations of state), Solids, Phase studies, Thermodynamics, Thermal expansion, Sodium compounds, Chlorides, Magnesium compounds, Oxides, Silicates, Magnetite, Silicon, Germanium, Iron, USSR.

Proceeding from the general concepts of the quantum theory of solid bodies, approximation expressions are obtained for the free energy of basic types of crystalline solid bodies (ions, valent and molecular crystals, metals). These expressions make it possible to obtain the equation of state as well as the compressibility and coefficient of thermal expansion as a function of pressure and temperature by the usual method. Constants entering into the formulas may be determined on the basis of experiments carried out at low pressure. The equations obtained are valid up to pressures at which some phase change takes place. Curves are given for several types of solid bodies (NaCl, MgO, Fe3O4, Mg2SiO4, Si, Ge, Fe). (Author)

AD-600 617 Div. 25
OTS price $.50

Oregon State Univ., Corvallis.
Z CENTER ENERGY LEVELS.
Technical rept. no. 7,
by Wilbur V. Johnson and Allen B. Scott.
20 May 63, 14p.
Contract Nonr1286 05, Proj. NR018 701
Unclassified report

Report on A Magnetic Study of Color Centers in Alkali Halides.

Descriptors: (*Crystal lattice defects, Color centers), (*Color centers, Atomic energy levels), Alkaline earth metals, Ions, Calcium,

by John T. Welch, Jr. 28 Apr 64, 48p. PSR23 2
Contract Nonr486 06 and Grant AF AFOSR444 63
Unclassified report

Descriptors: (*Integral equations, Numerical analysis), (*Boundary valve problems, Elasticity), Cylindrical bodies, Fracture (Mechanics), Stresses, Distribution, Tensile properties.

The non-singular Fredholm integral equation is solved numerically. The equation was derived by Sneddon and Collins in the analytical treatment of the stress field in a long cylinder containing a penny-shaped crack being opened by an arbitrary axially symmetric pressure. In the discussion of the numerical treatment, emphasis is on techniques which allow the treatment of additional cases, without excessive recomputation. Results are given for constant, parabolic, and step pressures across the crack, with variations in crack width and Poisson's ratio. The shape of the crack is also obtained in many cases. (Author)

AD-600 519 Div. 25
OTS price $2.50

Air Force Materials Lab., Research and Technology Div., Wright-Patterson AFB, Ohio.
INVESTIGATION OF SINGLE-CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE: MICROSTRUCTURAL FEATURES AND MICROHARDNESS.
Technical documentary rept., June 61-Oct 63,
by S. A. Mersol, C. T. Lynch and F. W. Vahldiek.
Apr 64, 107p.
Proj. 7350, Task 735001
ML TDR64 32 Unclassified report

Descriptors: (*Single crystals, Titanium compounds), (*Borides, Microstructure), Crystal structure, Hardness, Refractory metals.

A Widmanstatten precipitate was observed in the basal (c) plane of the crystal. This line or platelet pattern occurs in the expected crystal habit with triangular or rhomboid configurations at 60 or 120 degree angles. In the prism (a) planes which are perpendicular to the basal plane, the platelets or lines of the Widmanstatten precipitate are viewed as parallel lines. A variation of this pattern occurs with harsher etching procedures to produce an acicular structure. Evidence of slip lines, dislocations, and subboundaries is found. The effects of annealing on the microstructure have been investigated. Below 2100 C the effects are slight, above 2300 C the Widmanstatten precipitate is dispersed throughout the matrix. Variations in Knoop microhardness have been correlated with orientation and structural imperfections in the crystals. The effect of various etchants on the microhardness has been investigated. Optimum results have been achieved with a 100-gram load. Indentations were classified into the classic six cracking classes. The highest values obtained were 3250±150 kg/sq mm for unannealed specimens and 3710±250 kg/sq mm for annealed specimens. (Author)

AD-600 526 Div. 25
OTS price $2.75

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
NON-EQUILIBRIUM IONIZATION AND MAGNETOHYDRODYNAMIC PHENOMENA.
Doctoral thesis,
by Arthur Sherman. May 64, 126p. R64SD36
Contract AF49 638 914
Unclassified report

Descriptors: (*Magnetohydrodynamics, Ionization), (*Ionization, Magnetohydrodynamics) (*Fluid flow), Electrical conductance, Magnetic fields, Equations, Hall effect, Charged particles, Electrons, Fluid mechanics, Electric fields, Electric currents.

The present report deals with the interaction between non-equilibrium ionization phenomena in a plasma and the non-uniform flow of that plasma. The phenomenon of non-equilibrium ionization is first analyzed for a stationary plasma in the presence of an electric field. It is then shown that similar phenomena will exist in a moving plasma in the presence of a magnetic field. Based on these concepts the appropriate species equations are derived and combined to yield a single fluid theory of the phenomena in question. By this device it is shown that in general the electrical conductivity may be expressed as a function of the current density. Using this idea and assuming simple functional dependencies the Hartmann flow is solved despite the non-linearity of the problem. Numerical solutions are also obtained when the Hall effect is present. Based on these calculations certain unexpected limitations on the physical parameters of the problem appear. (Author)

AD-600 531 Div. 25, 8
OTS price $1.00

Valley Forge Space Technology Center, Philadelphia, Pa.
INVESTIGATION OF MAGNETICALLY INDUCED IONIZATION.
Semi-annual technical summary rept., 1 Nov 63-30 Apr 64.
30 Apr 64, 40p.
Contract Nonr386700
Unclassified report

Descriptors: (*Gas ionization, Xenon), (*Xenon, Gas ionization), (*Magnetohydrodynamics, Electric power production), Plasma physics, Excitation, Reaction kinetics, Shock waves, Impurities, Heating, Alkali metals.

Three modes of magnetically induced ionization were observed in Xenon, depending on whether the initial conductivity was electron-atom or electron-ion collision dominated. A study on the effect of impurities on the ionization rate in Xenon shock waves was undertaken. It was observed that diatomic impurities as low as 100 ppm can significantly increase the ionization rate and that the ionization is due to the electronic excitation of low-lying molecular states. (Author)

AD-600 535 Div. 25
OTS price $1.00

Cruft Lab., Harvard Univ., Cambridge, Mass.
RECEPTION AND TRANSMISSION OF TRANSIENT ELECTROMAGNETIC FIELDS.
Technical rept.,
by Hans J. Schmitt. 13 Jan 64, 38p. Cruft TR434
Contract Nonr1866 26, Proj. NR371 015
Unclassified report

Descriptors: (*Loop antennas, Wave transmission), (*Conical antennas, Wave transmission), (*Electromagnetic fields, Antennas), Transmission lines, Transients.

The receiving and transmitting properties of small linear antennas, conical antennas, and loops for transient electromagnetic fields were investigated experimentally. Short electrical dipoles loaded by a capacitance represented by a cathode follower can be used successfully for the measurement of transient fields with rise times of less than 1 nanosecond, if the first

METALLIC FIELD EFFECT.
Technical rept. no. 13,
by H. J. Juretschke. 1 June 64, 17p.
Contract Nonr83937, Proj. NR017 424
Unclassified report

Descriptors: (*Films, Electrical conductance), (*Metal films, Electrical conductance), Electrostatics, Electrons, Transport properties, Mathematical models.

The change in surface conductance due to the metallic field effect was calculated for various simple thin film models which take into account that the penetration depth of applied fields in metals is very small, and that mean-free-path effects are important in the very thin films in which the field effect is observable. Comparison with experiment of the behavior to be expected due to effective changes in surface scattering, surface charge density, or film thickness shows that the latter mechanism seems to be predominant. Predictions of this model regarding the magnitude of the field effect are given. (Author)

AD-600 687 Div. 25, 26
OTS price $.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
RESEARCH ON THE PHOTOELECTRIC DETERMINATION OF STRESSES DUE TO THE DEAD WEIGHT IN PLANE STRUCTURES,
by P. Locatelli, G. Grandori and G. Moravia.
15 May 64, 16p.
RSIC 176; TT 64 11685
Unclassified report

Trans. of la Ricerca Scientifica (Italy) 1955, v. 25, no. 1, p. 80-91.

Descriptors: (*Structures, Stresses), (*Stresses, Photoelectricity), (*Photoelasticity, Models (Simulations)), Manufacturing methods, Acceleration, Motion, Dams, Rubber, Italy.

For the photoelastic analysis of stresses due to dead weight, a stretching method is proposed which makes it possible to manufacture models with materials having a relatively high elastic modulus. The dead weight is artifically increased by imparting an acceleration to the model which is obtained by moving it with a rapid alternating motion or with an accelerated nonperiodic motion by means of elastic devices. After a description of the experimental equipment, the results obtained are discussed. The tests were carried out on two models of gravity dams, made with araldite and rubber. (Author)

AD-600 720 Div. 25
OTS price $3.50

Army Missile Command, Redstone Arsenal, Huntsville, Ala.
THE REFLECTION OF ELECTROMAGNETIC RADIATION. (BASED ON CLASSICAL ELECTRODYNAMICS). VOLUME II. APPENDIX: TABLES OF RADIATION REFLECTION FUNCTIONS,
by Herbert B. Holl. 15 Mar 63, 223p.
AMC RA RF TR63 4 Unclassified report

Descriptors: (*Electromagnetic wave reflections, Functions), Tables, Integrals.

AD-600 725 Div. 25, 8
OTS price $2.50

Kansas State Univ., Manhattan.
THE PREPARATION AND PROPERTIES OF THIN FILMS OF SEMICONDUCTORS.
Final rept.,
by E. Brock Dale, Gerard Senecal, David H. Huebner, Fred K. Wong and Allen Behle. 1 Mar 64, 114p.
Contract AF19 604 7218, Proj. 5621, Task 562103
AFCRL 64 278 Unclassified report

Descriptors: (*Semiconducting films, Electrical properties), (*Semiconducting films, Preparation), Indium compounds, Antimony alloys, Vapor plating, Vacuum apparatus, Glass, Electrical conductance, Hall effect, Heat treatment, Diffraction analysis, Microstructure, Magnetic properties.

Thin films of InSb were prepared by the vacuum evaporation of the compound onto glass substrates. Irreversible changes which took place in the electrical conductivity and Hall coefficient during film annealings, and differences between the diffraction patterns of annealed and unannealed films were examined in detail. Surface replicas of both annealed and unannealed films were photomicrographed. Galvanomagnetic properties of annealed films -- notably the temperature dependence of the conductivity, the Hall coefficient, and the mobility -- were compared with the same properties in bulk material. (Author)

AD-600 729 Div. 25
OTS price $.50

Metals Research Lab., Carnegie Inst. of Tech., Pittsburgh, Pa.
THE EQUILIBRIUM AND KINETIC MORPHOLOGY AND STRUCTURE OF SOLID SURFACES.
Final rept., 1 Feb 61-31 Jan 64,
by W. W. Mullins. 21 May 64, 5p.
Grant DA ORD31 124 61G11
AROD 2781 8 Unclassified report

Descriptors: (*Surfaces, Transport properties), (*Crystal structure, Surfaces), Dynamics, Microscopy, Anisotropy, Isotropism, Diffusion, Solids.

The broad aim of the project was to study the form of solid surfaces both on a macroscopic and an atomic scale as it develops under equilibrium conditions and under specified kinetic conditions. (Author)

AD-600 743 Div. 25
OTS price $1.00

Stanford Univ., Calif.
FINITE INDENTATION OF AN ELASTIC MEMBRANE BY A SPHERICAL INDENTER,
by N. M. Bhatia and W. Nachbar. Feb 64, 35p.
SUDAER182
Grant DA ARO D31 124G464, Proj. 59901007
Unclassified report

Descriptors: (*Membranes, Elasticity), (*Sheets, Plasticity), Deformation, Deflection, Stresses, Spheres, Mathematical analysis.

Rotationally symmetric stresses and deformations are considered for a prestressed elastic sheet of circular outer boundary loaded transversely by a centered indenter with a hemispherical tip. A nonlinear membrane solution is obtained for the portion of the sheet that is in frictionless contact with the rigid tip of the indenter. This solution and the solution that was previously obtained for a prestressed annular membrane are used to obtain the exact solution for stresses and deflections in the indented membrane. Simpler, limiting expressions for stresses and deflections are also obtained for sufficiently

Strontium, Alkali metal compounds, Halides, Sodium compounds, Potassium compounds, Chlorides.

The purpose of the work was to calculate the electronic energy levels of the simplest of these models, the unassociated alkaline earth cation with one trapped electron. The problem is treated as a one-electron problem, and the solution is estimated by using one-parameter hydrogen-like trial wave functions in a variational procedure. The impurity cation is treated as a substitutional distributed charge, the distribution being determined from the statistical procedure of Thomas and Fermi. The host lattice is considered to be an essentially continuous dielectric medium, the only discontinuity being the spherical cavity in which the divalent cation is placed. Account is taken of the lattice polarization by using an effective dielectric constant that is a function of both the high- and low-frequency dielectric constants. (See also AD-415 999). (Author)

AD-600 639 Div. 25, 30
OTS price $5.60

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
LOW DENSITY EFFECTS ON HEAT TRANSFER IN HYPERSONIC FLIGHT,
by Martin Kaplan. 1961, 56p. R61SD45
Contract AF33 600 41827
Unclassified report

Descriptors: (*Heat transfer, Density), (*Hypersonic flow, Heat transfer), Entropy, Gas flow, Boundary layer, Aerodynamic heating, Thermodynamics, Viscosity, Hypersonic flight.

This paper discusses various low density effects on convective heat transfer, and presents useful design information on the individual effects. These low density effects include the merged viscous layer, slip, viscous interaction, transverse curvature, entropy gradient, non-equilibrium, transition and free molecule effects. Hoshizaki's merged viscous layer analysis is discussed and compared to a similar analysis by Probstein and Kemp. Both found that the merged viscous layer effect increases the heat transfer over continuum values. The effect of shock layer entropy gradients on the surface heat transfer is also presented. It is shown that entropy gradients increase the heat transfer, particularly for those portions of the body whose impinging streamlines have passed through the highly oblique regions of the shock. A simplified, approximate engineering method has recently been developed by the author, in order to predict the surface heat transfer on a flat plate with pressure gradient, caused by nose bluntness and viscous interaction effects. This method is discussed, including the attempts of this method to allow for the effect of sweep and angle of attack on the heat transfer. It is also shown that the effects of slip are small compared to other low density effects. (Author)

AD-600 650 Div. 25
OTS price $1.00

Space Sciences, Inc., Waltham, Mass.
NANOSECOND PULSE BREAKDOWN IN GASES.
Final rept.,
by P. Felsenthal and J. M. Proud. Mar 64, 32p.
Contract AF30 602 2779, Proj. 4506, Task 450603
RADC TDR64 38 Unclassified report

Descriptors: (*Pulse compression, Gas discharges), (*Plasma physics, Gas ionization), Pulse rate, Air, Helium, Nitrogen, Microwaves, Dielectric properties, Voltage, Measurement, Theory, Radar pulses.

It is shown analytically that under certain conditions pulsed DC and pulsed microwave breakdown are directly comparable. A pulsed DC experimental system to measure breakdown over a wide range of applied voltage, gas pressure and gap distance was used to measure formative time in air, helium and nitrogen. The results when compared with the theoretical predictions of breakdown confirm the utility of the theory in describing breakdown within the imposed limits. The accuracy and extent of the present measurements materially extend the present range of pulsed microwave breakdown data. (Author)

AD-600 659 Div. 25
OTS price $.75

Aerospace Corp., Los Angeles, Calif.
LARGE DISPLACEMENT ANALYSIS OF BUCKLING OF AXIALLY COMPRESSED CIRCULAR CYLINDRICAL SHELLS,
by C. H. Tsao. 27 Mar 64, 27p. TDR269 4230 30 3
Contract AF04 695 269
SSD TDR64 24 Unclassified report

Descriptors: (*Structural shells, Buckling (Mechanics)), (*Cylindrical bodies, Structural shells), Deformation, Nonlinear differential equations, Elasticity, Strain (Mechanics), Loading (Mechanics).

Full expressions for membrane and bending energy densities are derived. The principle of minimum potential energy is used to determine the buckling load. It is found that the buckling load has a dependency on the thickness to radius ratio, t/R. For t/R approaching zero, this buckling load approaches that obtained by neglecting nonlinear meridional and circumferential displacements. For t/R equal to 0.03, the former is 4.5 per cent higher than the latter. A curve is furnished showing the variation of the buckling load with t/R. An erroneous strain-displacement relationship given in Novozhilov's book, 'Foundations of the Nonlinear Theory of Elasticity', is pointed out and corrected. (Author)

AD-600 676 Div. 25
OTS price $.50

Naval Ordnance Lab., Corona, Calif.
TECHNIQUES AND APPARATUS FOR EVAPORATING COMPOUND SEMICONDUCTORS
by G. G. Kretschmar and R. F. Potter. 1 Apr 64, 15p.
NAVWEPS 8190 Unclassified report

Descriptors: (*Semiconducting films, Vapor plating), (*Thin films (Storage devices)), Indium compounds, Antimony alloys, Arsenides, Crystals, Vapor plating, Vacuum apparatus, Production, Evaporation.

An apparatus for producing thin films of intermetallic semiconductors is described. It has been used for producing films of indium antimonide and indium arsenide as well as mixed crystal films of these two compounds. The principal improvements over older equipments are independently shielded evaporators and a substrate heater suspended in quartz tubes so that the substrate can be heated by radiation from above. (Author)

AD-600 681 Div. 25
OTS price $.50

Polytechnic Inst. of Brooklyn, N. Y.
MEAN FREE PATH AND BOUNDARY INFLUENCES IN THE

Characteristic layer-like field inhomogeniities in homogeneous photoconductors which move from cathode to anode must occur when the carrier density n decreases with increasing field F as n approx. F(-alpha) if alpha > 1 - beta, with carrier mobility micron approx. F(-beta). The decrease in n can be caused by field quenching. The critical voltage for initiation of these inhomogeneities decreases with optical excitation and increases with optical quenching in agreement with theory and experiment. (Author)

AD-600 845 Div. 25
OTS price $1.00

Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.
OPERATING POINTS AND STABILITY LIMITS OF A HIGH PRESSURE DIRECT CURRENT PLASMA ARC,
by S. D. Raezer. Mar 64, 33p. CM1043
Contract NOw62 0604c
Unclassified report

Descriptors: (*Plasma physics, Stability), Electric arcs, Direct current, Operation, Thermodynamics, Enthalpy, Heat transfer, Numerical analysis.

Procedures employed in determining the operating points and stability limits of the APL split-ring, 10-megawatt plasma arc are described. General solutions are obtained and the numerical procedure for mapping areas of arc operation is described. (Author)

AD-600 873 Div. 25, 9
OTS price $3.50

Institute for Aerospace Studies, Univ. of Toronto (Ontario).
A STATE-OF-THE-ART SURVEY OF SOME ASPECTS OF THE MECHANICS OF RAREFIED GASES AND PLASMAS.
Final rept.,
by G. N. Patterson. Apr 64, 235p.
Contract AF33 616 6990, Proj 7046
ARL 64 60 Unclassified report

Descriptors: (*Plasma physics, Kinetic theory), (*Superaerodynamics, Kinetic theory), Mechanics, Molecular beams, Monte Carlo method, Relativity theory, Charged particles, Reviews.

The report presents a survey of some aspects of the kinetic theory of rarefied gases (neutral molecules) and a brief introduction to the characteristics of ensembles of identical charged particles. Consideration is given to the derivation and properties of the Boltzmann equation. (Author)

AD-600 879 Div. 25, 17
OTS price $2.00

General Dynamics/Convair, San Diego, Calif.
LINEAR STRAIN THEORY AND THE SMITH METHOD FOR PREDICTING FATIGUE LIFE OF STRUCTURES FOR SPECTRUM TYPE LOADING.
Rept. for May 61-Dec 63,
by Clarence R. Smith. Apr 64, 74p. GDC63 113
Contract AF33 616 8228, Proj. 7063, Task 706302
ARL 64 55 Unclassified report

Descriptors: (*Fatigue (Mechanics), Test methods), (*Structure, Life expectancy), (*Strain (Mechanics), Theory), Loading (Mechanics), Stresses, Fracture (Mechanics), Failure (Mechanics), Aluminum alloys, Mechanical properties, Mathematical prediction.

Theoretical and test data are presented for two methods of predicting fatigue life. The first method requires preknowledge of stress concentration and nominal stress; the second requires preknowledge of neither. Both employ smooth specimen S-N curves and consider effects of stresses at a concentration. The first method, the linear strain theory, assumes that strain at the concentration is proportional to load within practical limits. Stress at the concentration, including residual stress, can therefore be obtained from conventional stress-strain curves, and these stresses are then used in conjunction with S-N curves to evaluate fatigue life. The second method, the Smith method, requires the life of a given structure in terms of a loading that is sufficiently high to ensure local yielding, which corresponds to a lifetime of less than 10,000 cycles for 7075-T6 and 40,000 cycles for 2024-T3. The unique feature of the latter method is that it does not require knowledge of either nominal stresses or stress at the concentration, stress at the concentration being obtained directly from smooth specimen test data for the material from which the structure is fabricated. (Author)

large and sufficiently small indenter loads. The theory shows that yielding and plastic deformation of the membrane is incipient for a relatively small value of the indenter load, and, for these experiments, this limiting value is less than the least value of indenter load for which data was reported. (Author)

AD-600 772 Div. 25, 17
OTS price $.50

Cruft Lab., Harvard Univ., Cambridge, Mass.
THE VARIATION OF PERIODICITY OF MAGNETIC STRUCTURE WITH DILUTION AND TEMPERATURE FOR THE HEAVY RARE-EARTH METALS.
Scientific rept. no. 1,
by Bernard R. Cooper. 24 Feb 64, 11p.
Contract AF19 628 3874, Proj. 5635, Task 563503
AFCRL 64 199 Unclassified report

Descriptors: (*Rare earth elements, Magnetic properties), (*Magnetic properties, Rare earth elements), (*Periodic variations, Magnetic properties), Temperature, Alloys, Metals, Neutron diffraction analysis, Yttrium.

A discussion is given of the several possible mechanisms proposed to account for the variation of periodicity of magnetic order for the heavy rare-earth metals. The relationship between the thermal variation of periodicity for a given metal and the variation of periodicity among the various metals at the ordering temperature is considered. Emphasis is put on the importance of the neutron diffraction experiments on alloys of heavy rare-earth metals diluted with yttrium for understanding the mechanism causing the periodicity variation. The type of interaction that seems most reasonable in fitting the various experimental evidence is suggested. (Author)

AD-600 798 Div. 25, 8, 30
OTS price $1.75

Electro-Optical Systems, Inc., Pasadena, Calif.
BASIC RESEARCH ON GAS FLOWS THROUGH ELECTRIC ARCS-HOT GAS CONTAINMENT LIMITS,
by G. L. Cann, R. D. Buhler, R. L. Harder and R. A. Moore. Mar 64, 65p.
Contract AF33 657 7940, Proj. 7063, Task 706303
ARL 64 49 Unclassified report

Descriptors: (*Gas flow, Electric arcs), (*Electric arcs, Gas flow), (*Plasma physics, Scientific research), Gases, Heaters, Graphics, Thermodynamics, Cascade structures, Electron optics.

Extensive measurements in a ''cascade'' type arc research apparatus were carried out with four gases (hydrogen, helium, ammonia, and argon), covering both the inlet region and the fully developed region of the coaxial flow discharge. The inlet (gas heater) region results for three gases were compared with the Stine-Watson first order theory. To estimate the ultimate technical limits of arc gas heater performance the well known approximate theories for the fully developed arc column (Parabola and Bessel Models) were extended to include radiation and, (for the high current regime) the self-magnetic pressure gradient. Hot gas containment limits (highest radially-averaged outlet enthalpy vs. pressure) were calculated for air, for a range of allowable wall heat loads (0.1-10 kw/sq cm). It is concluded that: (1) Heat loads from mechanisms other than the simple hot gas containment (e.g. electrode heat loads, local seeondary arcs, etc.) have so far limited the enthalpy-pressure values achieved. (2) Gas heater performance substantially above the 1961 state of the art curve appears technically possible, with optimum designs. (Author)

AD-600 799 Div. 25, 8, 26
OTS price $1.00

Mallory (P. R.) and Co., Inc., Burlington, Mass.
INVESTIGATION OF ULTRA HIGH VACUUM SPUTTERED THIN FILMS.
Scientific rept. no. 1,
by S. P. Wolsky. May 64, 36p.
Contract AF19 628 3840, Proj. 5621, Task 563405
AFCRL 64 360 Unclassified report

Descriptors: (*Semiconductors, Films), (*Germanium, Metal films), (*Sputtering, Semiconductors), Quartz, Epitaxial growth, Hall effect, Resistance (Electrical), Vacuum systems, Semiconducting films, Thin films (Storage devices).

The initial results of an investigation into the application of rigidly controlled low pressure sputtering techniques to the formation of thin semiconductor films are presented. A unique sputtering chamber has been developed which allows simultaneous deposition on two substrates whose temperatures are controlled independently. Structural and electrical properties of germanium films deposited on quartz and self-substrates are presented. One of the most significant structural factors is the observance of epitaxy at temperatures below 200 C. Hall coefficient, resistivity, and mobility data for germanium on quartz films closely resembles that of other workers. Electrical measurements were also made on an amorphous n-type film. (Author)

AD-600 820 Div. 25, 8
OTS price $1.00

RAND Corp., Santa Monica, Calif.
CONDUCTIVITY OF A HOT ELECTRON GAS,
by V. Gilinsky and D. F. DuBois. June 64, 37p.
RM4109PR
Contract AF49 638 700
Unclassified report

Rept. on Properties of High Temperature Plasmas.

Descriptors: (*Plasma physics, Electrical conductance), Gases, Electrons, Incoherent scattering, High frequency, Tensor analysis, Quantum statistics, Mathematical models.

The dissipative part of the high frequency conductivity tensor of a hot, dilute electron gas near equilibrium is calculated exactly to terms proportional to the plasma parameter k sub D cubed/n, (the inverse of the number of particles in a Debye sphere), in the limit of classical statistics. The calculation includes high frequency collective dynamic screening effects consistently to this order. These collective effects have an important effect on the frequency dependence of the conductivity for frequencies greater than about twice the electron plasma frequency. (Author)

AD-600 830 Div. 25
OTS price $.50

Delaware Univ., Newark.
LAYER-LIKE FIELD INHOMOGENEITIES IN PHOTOCONDUCTORS IN THE PRE-BREAKDOWN RANGE,
by K. W. Boer. 1964, 12p.
Grant Nonr G00046 63
Unclassified report

Descriptors: (*Photoelectric materials, Electrical properties), (*Crystals, Optical properties), Excitation, Voltage, Functions, Field theory.

practice, Ordnance), Operation, Specifications, Job analysis, Machine tools,

Contents: Formula Report, Work Sheets and Instructions; Tables and Charts; List of Constants and Synthesis; and Table of Elements and Methods Analysis Sheets.

AD-600 195 Div. 26, 22
OTS price $2.60

Naval Ordnance Plant, Forest Park, Ill.
ENGRAVER.
NOPF Standard Time Formula.
1957, 23p.
NOPF Formula Engraver Unclassified report

Descriptors: (*Presses (Machinery), Time studies), (*Time studies, Presses (Machinery)), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis.

Time values contained in this formula apply to operations as performed on all Gorton Engraving Machines. Basic element times were developed by direct observation and application of the M.T.M. data. Constant time values expressed on the work sheets were developed by synthesizing the basic elements. (Author)

AD-600 196 Div. 26, 22
OTS price $7.60

Naval Ordnance Plant, Forest Park, Ill.
FIXTURE (F-1, F-2, F-3).
NOPF Standard Time Formula.
May 56, 80p.
NOPF Formula F1 Unclassified report

Descriptors: (*Jigs, Drills), (*Time studies, Jigs), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis, Machine tools, Clamps.

The time values developed in this formula are based on the study of approximately fifteen humdred drill jigs normally used on the sensitive drill press. Due to the wide variety of jigs encountered, an individual formula was needed to develop accurate operating times for all jigs. After a preliminary study, it was obvious that the greater percent of the jigs could be classified into four basic types: (1) Box Jigs, (2) Sandwich Jigs, (3) Pump Jigs, and (4) Plate Jigs. In all four types, a wide variety of clamping devices are used, such as leaf gates, leaf gates with one-quarter turn thumb screws, Allen screws, etc. In one jig alone, several different devices might be used. Individual MTM studies covering the operation of each of the different types of clamping devices were made. These studies were taken by observing the many different locations of the clamping devices used and establishing average time values. Values given in the table of elements are total values. They include both the insertion and removal of parts, tightening and loosening of screws, etc. (Author)

AD-600 197 Div. 26, 22
OTS price $6.60

Naval Ordnance Plant, Forest Park, Ill.
INTERNAL GRINDER (GR-2).
NOPF Standard Time Formula.
1957, 70p.
NOPF Formula GR2 Unclassified report

Descriptors: (*Grinders, Time studies), (*Time studies, Grinders), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis, Machine tools.

Contents: Formula Report, Work Sheets and Instructions; Charts; List of Constants and Synthesis; and Table of Elements and Methods Analysis Sheets.

AD-600 198 Div. 26, 22
OTS price $12.50

Naval Ordnance Plant, Forest Park, Ill.
MATTISON SURFACE GRINDER (GR-4).
NOPF Standard Time Formula.
1957, 175p.
NOPF Formula GR4 Unclassified report

Descriptors: (*Grinders, Time studies), (*Time studies, Grinders), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis, Machine tools.

Formula report for the time studies of a Mattison surface grinder operation is presented. Included in the report are work sheets, instructions, specifications, list of constants and synthesis and table of elements and methods analysis sheets.

AD-600 199 Div. 26, 22
OTS price $6.60

Naval Ordnance Plant, Forest Park, Ill.
WALES-STRIPPIT METAL FABRICATOR (MS-27) (SM-27).
NOPF Standard Time Formula.
1957, 63p.
NOPF Formula SM27 Unclassified report

Descriptors: (*Machine tools, Time studies), (*Time studies, Machine tools), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis, Mechanical working.

This formula was made to assist the Production Methods & Standards Specialist to plan the operation and accurately estimate the time required to perform a given punching, notching, or nibbling operation in the U.S. Naval Gun Factory. (Author)

AD-600 200 Div. 26, 22
OTS price $10.10

Naval Ordnance Plant, Forest Park, Ill.
MILLING MACHINE (M-1).
NOPF Standard Time Formula.
1957, 130p.
NOPF Formula M1 Unclassified report

Descriptors: (*Milling machines, Time studies), (*Time studies, Milling machines), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis, Machine tools.

Formula report for the time studies of a milling machine operation is presented. Included in the report are work sheets, instructions, specifications and a list of constants and synthesis.

AD-600 201 Div. 26, 22
OTS price $5.60

Naval Ordnance Plant, Forest Park, Ill.
MILLING MACHINE (M-3).

26. PRODUCTION AND MANAGEMENT

AD-600 060 Div. 26, 8
OTS price $1.00

Motorola, Inc., Phoenix, Ariz.
HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) AND HIGH SPEED SEMICONDUCTOR SWITCH (GATE).
Quarterly rept. no. 3, 29 Nov 63-28 Feb 64,
by B. G. Burlingame. 28 Feb 64, 39p.
Contract DA36 039AMC01475E
Unclassified report

Descriptors: (*Semiconductor devices, Production), (*Electronic switches, Semiconductors), Electrical properties, Military requirements, Manufacturing methods.

A pilot production facility capable of producing high speed semiconductor switches in accordance with Signal Corps technical specifications is considered. The major problem areas to be overcome in order to achieve the purpose of this program are forward breakover voltage and current on the two-terminal device, forward blocking current on the three-terminal device, and switching speeds, current carrying capabilities, forward anode voltage, and rate of forward voltage rise on both devices. Work performed during the period 29 November 1963 through 28 February 1964 is covered. Data on the second group of engineering samples is contained in this report. Results from engineering studies and progress made on die, package and test equipment design are reported. (Author)

AD-600 184 Div. 26, 30
OTS price $2.75

Electronic Systems Div., Air Force Systems Command, Bedford, Mass.
AN INTRODUCTION TO PERT COST,
by Frank T. Mooty. Mar 64, 130p.
ESD TDR64 208 Unclassified report

Descriptors: (*Management control systems, Costs), Management planning, Data processing systems, Scheduling, Statistical data, Time studies.

A general introduction to PERT COST, an innovation in the field of management. This technique employs a networking, statistical and scheduling methodology using advanced data processing procedures. The PERT COST technique is based on the principle that planning must be developed in a manner that facilitates its use as a management control tool and a management control system must use as its base the planning that governs the program. Accordingly, PERT COST can be used in both the planning and control functions of management. (Author)

AD-600 190 Div. 26, 22
OTS price $5.60

Naval Ordnance Plant, Forest Park, Ill.
ANODIZE.
NOPF Standard Time Formula.
1961, 59p.
Unclassified report

Descriptors: (*Electroplating, Time studies), (*Time studies, Electroplating), (*Machine shop practice), Operation, Specifications, Job analysis, Electroplating solutions, Ordnance.

Contents: Formula Report, Work Sheet, and Instructions; Tables and Charts, Common Types of Racks, Chromic Acid, and Sulfuric Acid Anodize Tank Specifications; List of Constants and Synthesis; and Table of Elements and Method Analysis Sheets.

AD-600 191 Div. 26, 22
OTS price $1.60

Naval Ordnance Plant, Forest Park, Ill.
ARTOS WIRE STRIPPING MACHINE.
NOPF Standard Time Formula.
1957, 13p.
Unclassified report

Descriptors: (*Time studies, Machine tools), (*Machine tools, Time studies), Machining, Wire, Operation, Operators (Personnel), Standards, Cutting tools, Machine shop practice, Job analysis, Ordnance.

NOPF standard time formula report for cutting to length and stripping both ends of wires using the ARTOS wire stripping machine.

AD-600 192 Div. 26, 22
OTS price $12.50.

Naval Ordnance Plant, Forest Park, Ill.
ASSEMBLY DATA.
NOPF Standard Time Formula.
1957, 173p.
NOPF Formula H.A.D. Unclassified report

Descriptors: (*Time studies, Machine shop practice), (*Machine shop practice, Time studies), Operation, Specifications, Job analysis, Manufacturing methods, Construction.

Formula report for time studies of assembly operations is presented. Included in the report are work sheets, instructions, specifications, list of constants and synthesis and methods analysis charts.

AD-600 193 Div. 26, 22
OTS price $1.60

Naval Ordnance Plant, Forest Park, Ill.
CENTER LAP (GR-8).
NOPF Standard Time Formula.
1958, 20p.
NOPF Formula GR8 Unclassified report

Descriptors: (*Machine tools, Time studies), (*Time studies, Machine tools), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis.

Formula report for the time studies of a center lapping operation is presented. Included in the report are work sheets, instructions, specifications and a list of constants and synthesis.

AD-600 194 Div. 26, 22
OTS price $9.10

Naval Ordnance Plant, Forest Park, Ill.
CENTERLESS GRINDER (GR-5).
NOPF Standard Time Formula.
1957, 105p.
NOPF Formula GR5 Unclassified report

Descriptors: (*Grinders, Time studies), (*Time studies, Grinders), (*Machine shop

Descriptors: (*Time studies, Lathes), (*Lathes, Time studies), Machining, Metals, Operation, Operators (Personnel), Standards, Machine shop practice, Plastics, Job analysis, Ordnance.

NOPF standard time formula report for the operation of the W and S No. 3 turret lathe.

AD-600 210 Div. 26, 22
OTS price $11.00

Naval Ordnance Plant, Forest Park, Ill.
WALES-STRIPPIT HYRA-NEW-MATIC (WS-1).
NOPF Standard Time Formula.
1957, 148p.
NOPF Formula WS1 Unclassified report

Descriptors: (*Time studies, Machine tools), (*Machine tools, Time studies), Material forming, Metals, Operation, Operators (Personnel), Standards, Machine shop practice, Job analysis, Ordnance.

NOPF standard time formula report for punching and nibbling operations using the Wales-Strippit fabricator Mod. 10-A.

AD-600 211 Div. 26, 22
OTS price $1.60

Naval Ordnance Plant, Forest Park, Ill.
WELDING (MW-1).
NOPF Standard Time Formula.
1957, 14p.
NOPF Formula MW1 Unclassified report

Descriptors: (*Welding, Time studies), (*Time studies, Welding), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis.

This Formula was developed for use in establishing time standards for all Manual Arc Welding Operations performed at NOPF with the type of equipment in use as of June 1959. It is suitable for use in time standard application to: Coated Electrode Arc Welding, Metal Arc Inert Gas Shielded Welding and Tungsten Arc Inert Gas Shielded Welding and on all applicable materials in all positions. Manual Arc Welding data was developed for use with NOPF Light and Heavy Assembly data in the complete standards application to Welding Assembly Operations, and the instructions for using the Assembly data are included in this Data Manual in their respective locations. All times shown on the Data Sheet are levelled times developed by elemental operations analyses, using Methods-Time Measurement and/or Time Study data in which no allowances are included. All welding process times are based on the operator using the correct current settings and electrode sizes as recommended by the manufacturers and/or engineering manuals. (Author)

AD-600 330 Div. 26, 8
OTS price $1.50

Bendix Corp., Southfield, Mich.
DEVELOPMENT OF ADAPTIVE CONTROL TECHNIQUES FOR NUMERICALLY-CONTROLLED MILLING MACHINES.
Interim technical documentary progress rept. no. 3, 1 Aug 63-29 Feb 64.
29 Feb 64, 55p.
Contract AF33 657 8782, Proj. 7 713
Unclassified report

Descriptors: (*Milling machines, Control systems), Control systems, Automatic, Digital-to-analog converters, Hydraulic servomechanisms, Control panels, Machining, Metals, Electronic equipment, Tests.

Phase III of a program directed toward the development of adaptive control techniques for numerically-controlled milling machines is described, and plans for Phase IV are reviewed. A complete prototype adaptive control system was fabricated and tested in conjunction with a profile-type milling machine. Results of the tests verified that all portions of the system were operating satisfactorily. The metalcutting tests begun in Phase II were extended to include additional workpiece and cutter materials, and to further investigate possible correlation of tool life and surface microfinish with measured machining variables. The collection of data for these tests was enhanced by redesigning the spindle instrumentation system to obtain improved reliability and rigidity. (Author)

AD-600 561 Div. 26, 14
OTS price $2.25

Institute of Tech., Univ. of Minnesota, Minneapolis.
SUMMARY OF TECHNICAL LITERATURE SURVEY ON DEHUMIDIFICATION AND DEHUMIDIFIED STORAGE.
Progress rept. no. 2.
15 June 54, 81p.
Contract NOy79585
Unclassified report

Descriptors: (*Storage, Humidity), (*Preservation, Materials), (*Warehouses, Controlled atmospheres), Driers (Apparatus), Degradation, Reviews.

A summary of literature on required atmospheric conditions for the storage of different types of materials, different methods of preservation of materials while in storage used by industry and government, types of dehumidification, sources and quantity of moisture for design purposes, effect of climatic conditions on storage, effect of different methods of storage on preservation of materials and equipment, and optimum conditions for storage. (Author)

AD-600 562 Div. 26, 14
OTS price $2.00

Institute of Tech., Univ. of Minnesota, Minneapolis.
EVALUATION OF U. S. NAVY DEHUMIDIFIED WAREHOUSE PROGRAM. PART II.
Progress rept. no. 4.
15 Feb 55, 77p.
Contract NOy79585
Unclassified report

Descriptors: (*Storage, Humidity), (*Preservation, Materials), (*Warehouses, Controlled atmospheres), Performance (Engineering), Driers (Apparatus), Military facilities, Naval shore establishments.

Contents: Procedure for Analysis of Dehumidified Building and Dehumidification Machine Performance; Analysis of Dehumidified Building and Dehumidification Machine Performance at Five U. S. Naval Activities; and Summary of Dehumidification Operations at Five U. S. Naval Activities.

NOPF Standard Time Formula.
1956, 52p.
NOPF Formula M3 Unclassified report

Descriptors: (*Milling machines, Time studies), (*Time studies, Milling machines), (*Machine shop practice, Ordnance), Operation, Specifications, Job analysis, Machine tools.

Formula report for the time studies of a milling machine operation is presented. Included in the report are work sheets, instructions, specifications and a list of constants and synthesis.

AD-600 202 Div. 26, 22
OTS price $12.50

Naval Ordnance Plant, Forest Park, Ill.
MILWAUKEE SIMPLEX MILL (M-6).
NOPF Standard Time Formula.
1957, 173p.
NOPF Formula M6 Unclassified report

Descriptors: (*Time studies, Milling machine), (*Milling machine, Time studies), Machining, Metals, Operation, Standards, Operators (Personnel), Machine shop practice, Job analysis, Ordnance.

NOPF Standard time formula report for straddle, form, slab, and plain milling using Milwaukee simplex milling machines models M-24 and 1236.

AD-600 203 Div. 26, 22
OTS price $8.10

Naval Ordnance Plant, Forest Park, Ill.
PIPE FABRICATING (PF-1).
NOPF Standard Time Formula.
1956, 89p.
NOPF Formula PF1 Unclassified report

Descriptors: (*Time studies, Material forming), (*Material forming, Time studies), (*Pipes, Production), Copper, Stainless steel, Brazing, Machine shop practice, Operators (Personnel), Standards, Job analysis, Ordnance.

NOPF Standard time formula report for fabricating stainless steel and copper pipes 3/4 in. and less in diameter.

AD-600 204 Div. 26, 22
OTS price $10.50

Naval Ordnance Plant, Forest Park, Ill.
POWER SHEARS (S-1).
NOPF Standard Time Formula.
1957, 132p.
NOPF Formula S1 Unclassified report

Descriptors: (*Time studies, Cutting tools), (*Cutting tools, Time studies), Metals, Metal plates, Sheets, Machining, Machine shop practice, Operators (Personnel), Standards, Job analysis, Ordnance.

NOPF Standard time formula report for shearing metals, not exceeding 1/2 in. in thickness, using power shears.

AD-600 205 Div. 26, 22
OTS price $10.50

Naval Ordnance Plant, Forest Park, Ill.
PUNCH PRESS (PP-1).
NOPF Standard Time Formula.
1957, 132p.
NOPF Formula PP1 Unclassified report

Descriptors: (*Time studies, Presses (Machinery)), (*Presses (Machinery), Time studies), Material forming, Metals, Materials, Machine shop practice, Standards, Operators (Personnel), Job analysis, Ordnance.

NOPF Standard time formula report for the operation of open back, inclinable punch presses, from 5-1/2 to 65 tons.

AD-600 206 Div. 26, 22
OTS price $2.60

Naval Ordnance Plant, Forest Park, Ill.
SPLINE MILL (M-4).
NOPF Standard Time Formula.
1957, 30p.
NOPF Formula M4 Unclassified report

Descriptors: (*Time studies, Milling machines), (*Milling machines, Time studies), Machining, Metals, Operation, Machine shop practice, Standards, Operators (Personnel), Job analysis, Ordnance.

NOPF Standard time formula report for slotting and grooving metals using Taylor and Fenn duplex spline mills models M-80 and M-54.

AD-600 207 Div. 26, 22
OTS price $13.50

Naval Ordnance Plant, Forest Park, Ill.
THREAD MILLING (M-5).
NOPF Standard Time Formula.
1957, 191p.
NOPF Formula M5 Unclassified report

Descriptors: (*Time studies, Milling machines), (*Milling machines, Time studies), Machining, Metals, Machine shop practice, Standards, Operators (Personnel), Job analysis, Ordnance.

NOPF standard time formula report for thread milling using 4 x 9 in. and 10 x 24 in. Hanson-Whitney thread milling machines.

AD-600 208 Div. 26, 22
OTS price $11.50

Naval Ordnance Plant, Forest Park, Ill.
VERTICAL TURRET LATHE (VTL-1).
NOPF Standard Time Formula.
1956, 158p.
NOPF Formula VTL1 Unclassified report

Descriptors: (*Time studies, Lathes), (*Lathes, Time studies), Machining, Metals, Operation, Operators (Personnel), Standards, Machine shop practice, Job analysis, Ordnance.

NOPF standard time formula report for turn, face, bore, counterbore and chamber using the 36 in. Bullard vertical turret lathe.

AD-600 209 Div. 26, 22
OTS price $10.50

Naval Ordnance Plant, Forest Park, Ill.
W & S #3 TURRET LATHE (TL-1).
NOPF Standard Time Formula.
1956, 132p.
NOPF Formula TL1 Unclassified report

would prevail. Seventy-two motors from field storage sites were visually and radiographically inspected, temperature conditioned and static fired. Thirty-three samples conditioned at -30 F performed satisfactorily. Seven motors fired after conditioning at +140 F, were determined to be unsatisfactory because of high chamber pressures, causing one motor's pressure relief disc to rupture. Of three samples fired after conditioning at +130 F, the pressure relief disc ruptured in one motor. Twenty-five motors were then conditioned at +120 F and performed satisfactorily. The 16-NS-1000, M15 Rocket Motor will perform satisfactorily at age eight years between temperature limits of -20 F to +110 F. (Author)

AD-600 420 Div. 27, 12
OTS price $6.00

Rocketdyne, Canoga Park, Calif.
ROCKET ENGINE VALVE POPPET AND SEAT DESIGN DATA.
Technical documentary rept., July 62-Oct 63,
ed. by G. F. Tellier. May 64, 498p. Rocketdyne R5494
Contract AF04 611 8392, Proj. 6753, Task 675304
RPL TDR64 68 Unclassified report

Descriptors: (*Valves, Configuration), (*Surfaces, Finishes and finishing), (*Seats, Vehicle body components), (*Rocket motors, Design), Fluid flow, Pressure, Stresses, Deformation, Seals (Stoppers), Adhesives, Sealing compounds, Metals, High-pressure valves, Mathematical prediction, Engineering.

Presented is a description of the work accomplished in summarizing current valve design technology and providing fundamental metal-to-metal seating characteristic design data. The program was conducted in two phases. Phase I is a survey of pertinent patents, technical literature, and industry data to determine current technology levels and indicate specific areas where information was lacking or obsolete. The accumulated material produced little worthwhile information on either the mechanics of sealing or the correlation between theoretical and actual characteristics. Phase II effort involved analytical and empirical studies of the detail aspects of valve sealing. Test models were fabricated with particular emphasis placed on describing the resultant sealing surfaces. Leakage flow data were obtained for the near-seated condition resulting in good correlation with theoretical predictions. The stress-leakage relationship in the on-seated condition was empirically investigated as a function of surface and material variations, pressure, and fluid. The resulting information, together with inspection evidence supporting deduced test surface finish conditions, is presented. (Author)

AD-600 440 Div. 27
OTS price $.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
POLAR CONSTRUCTION EQUIPMENT UNIVERSAL ENGINE-STARTING KIT.
Final rept.,
by S. E. Gifford. 25 May 64, 19p.
Proj. Y F015 11 01 291
NCEL R311 Unclassified report

Descriptors: (*Engine starters, Cold weather tests), (*Internal combustion engines, Engine starters), (*Engines & motors, Liquid cooled), Engine primers, Heaters, Cold weather tests, Polar regions.

This report covers the development and testing of an engine-mounted kit to facilitate starting and operating liquid-cooled engines in low temperatures. The kit was designed to preheat the engine, oil, and battery and to provide ignition assistance during cranking. The components included a gasoline-burning coolant heater, an electric coolant heater, an ether priming system, a battery heating system, and a crankcase shroud. Laboratory tests and field trials show that the kit as a whole was adequate for low-temperature engine starting when using sub-zero oil for the engine lubricant. However, with a change to 20-weight oil in the mid-1950's it was found that the kit heaters did not provide sufficient heat for engine starting in temperatures below 0 F. The ether priming system and the battery heating system were found to be useful starting and operating aids for liquid-cooled engines on polar transportation and construction equipment under all conditions. (Author)

AD-600 487 Div. 27
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SELF-ALIGNMENT AND BALANCING OF COAXIAL ROTORS,
by E. G. Berger and A. S. Kal'zon. 26 Mar 64, 7p.
FTD TT64 75; TT 64 11712
Unclassified report

Unedited rough draft trans. of Leningrad U. Vestnik (USSR) 1963 (v. 18) no. 3 (Seriya) Matematiki, Mekhaniki i Astronomii (no. 1) pp. 119-121.

Descriptors: (*Gas turbine rotors, Stabilization), Turbine parts, Alignment, Momentum, Oscillation, Damping, Supports, Equations, Mathematical analysis, USSR.

In modern gas-turbine engines wide application has been found for dynamic systems formed by two coaxial rotors turning with different values for their angular velocity. At high angular velocity of the rotors the basic problem of dynamics is the distribution of the critical numbers of turns outside of the zone of the operation velocities, the lowering of the vibration overloads and amplitudes of oscillations in the transition through the critical number of turns, the diminishing of the dynamic components of the support reactions, and the self-alignment of the rotors in the zone of operational velocities. One of the possible means of solving this problem is the making use of the effect of self-alignment of a rigid rotor turning in two elastic supports and the spreading of this effect over the system of coaxial rotors, which are turning with different angular velocities. (Author)

AD-600 506 Div. 27
OTS price $.75

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THERMAL STRESSES IN AIR COOLED DISKS OF ROTARY GAS TURBINES,
by E. Tuliszka. 11 May 64, 24p.
FTD TT64 145, TT 64 11720
Unclassified report

Unedited rough draft trans. of Technika Lotnicza (Poland), 18:7, pp. 168-176, 1963.

Descriptors: (*Gas turbine rotors, Thermal stresses), (*Disks, Air-cooled), Thermal properties, Functions, Mathematical analysis, Impellers, USSR.

Division 27 - PROPULSION SYSTEMS

AD-600 657 Div. 26
OTS price $1.25

Ampex Corp., Redwood City, Calif.
AN INVESTIGATION OF SELF-ACTING FOIL BEARINGS,
by Joseph T. Ma. Mar 64, 41p. Ampex RR64 3
Contract Nonr3815 00, Proj. NR062 297
Unclassified report

Descriptors: (*Bearings, Foils), (*Films, Measurement), Measurement, Lubrication, Air, Thickness.

Experimental results on the interior and exit region film thickness measurements of self-acting foil bearings are presented and discussed. These measurements were made with capacitive sensors and conductive foils. The validity of a growing sinusoidal film thickness in the exit region first predicted by Gross is clearly evidenced from the photographs. The measured wave lengths checked with Barlow's calculated values within 6 percent. For a constant relative velocity, the effect of increasing tension is to decrease the film thickness; while for a constant tension, the effect of increasing speed is to increase the film thickness. The effect of gas compressibility becomes important for high relative velocity; and the effect of surface roughness greatly influences either the predicted or measured values for thin film thickness. The data presented in this report cover a range of drum linear speed from 30 to 1942 in/sec and tape tension from 0.054 to 3.24 lb/in. (Author)

AD-600 674 Div. 26, 4
OTS price $.75

Aerojet-General Corp., Downey, Calif.
EXPLORATORY EXPERIMENTS ON KINETICS AND MECHANISMS OF COMMINUTION.
Special rept.,
by T. G. Owe Berg and L. E. Avis. Oct 63, 22p.
AGC0395 04 13SP
Contract DA18 108 405CML829
Unclassified report

Descriptors: (*Powders, Preparation), Sodium compounds, Chlorides, Particle size, Material forming, Dynamics, Single crystals, Fracture (Mechanics), Surface area, Humidity, Ball mills.

Sodium chloride was milled in a standard laboratory ball mill for various periods of time between 15 minutes and 16 hours at two relative humidities of the air, 0.5% and 4%. The particle size was determined by sieve analysis. The particle shape was observed in the microscope. At 4% RH, severe caking occurred during 8 hours of milling. At 0.5% RH, there was substantial agglomeration, but much less than at 4% RH. The particle size increased continuously when milling was continued for 4 hours or more. The mechanism of comminution could be easily followed under these conditions. At 4% RH, the material first cleaved into single crystal platelets of almost perfect squares. These were first reduced by breaking off corners and later by fracture into two equal pieces. It is concluded that the fracture occurs where the stress exceeds the strength of the material, and that the particle size obtained is independent of cracks and flaws. The surface area has nothing to do with the breakup, only with the agglomeration. (Author)

AD-600 706 Div. 26, 17, 25
OTS price $.50

Naval Ordnance Test Station, China Lake, Calif.
THE APPLICATION OF ULTRASONICS TO WIRE DRAWING.
Quarterly progress rept. for 1 Jan-31 Mar 64,
by A. T. Robinson, J. C. Connelly, and L. M. Stayton. Apr 64, 7p.
NOTS TP3542, NOTS TPR364 Unclassified report

Descriptors: (*Wire, Mechanical working), (*Ultrasonic radiation, Wire), (*Drawing (Machine processing), Metals), Mechanical working, Iron, Copper, Tensile properties, Creep, Deformation.

Recent tests on iron and copper thermocouple wire revealed that surface imperfections and rust prevent consistent results during wire drawing operations. Tests performed at severe area reductions under ultrasonic radiation resulted in tensile failure of the drawn wire. A reduction of yield strength in an ultrasonic environment was cited as the probable cause. A second isolator and back tension device were installed between die and wire supply reel. (Author)

AD-600 859 Div. 26
OTS price $.50

Forest Products Lab., Madison, Wis.
WOODWORKING MACHINES.
May 64, 9p.
FPL 048 Unclassified report

Descriptors: (*Machines, Wood), (*Saws, Wood), Milling machines, Industrial equipment, Material separation.

Woodworking machines are made to do a wide variety of jobs. For any one job there are usually a number of makes, sizes, and styles of machines from which to choose. They are not standardized. Only a brief classification and outline of specifications for fairly typical machines of the more important types is attempted. Small light machines of the home workshop size are not included. Woodworking machines may be divided into three broad classes based on function: sawmill, planing mill, and industrial plant machinery. The function of sawmill machinery is to cut the log into rough, green lumber. The planing mill takes the rough lumber (usually dry), and prepares it for general construction uses, such as flooring, siding, shiplap, or framing. The industrial plant cuts up lumber and makes it into doors, furniture, boxes, or other fabricated products. (Author)

27. PROPULSION SYSTEMS

AD-600 324 Div. 27
OTS price $.75

Ogden Air Materiel Area, Hill AFB, Utah.
SURVEILLANCE TEST OF SHELF LIFE OF ROCKET MOTOR, 16-NS-1000, M15.
OOAMA Airmunitions test rept.,
by George H. Kawanishi. May 64, 25p.
OOY TR64 761 Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Storage), (*Jatos, Storage), Rocket igniters, Temperature, Tests, Aging (Materials).

Previous tests of the 16-NS-1000, M15 Rocket Motor have established temperature limits of -20 F to +130 F for motors, ages five to seven years. This test was established to determine if the shelf life could be extended to eight years, and to determine what temperature limits

Quarterly progress rept. no. 4, 20 Feb-20 May 64, by E. P. Gilewicz. 20 May 64, 70p. WAD R407 4
Contract AF04 611 9064
Unclassified report

Descriptors: (*Rocket cases, High-pressure research), (*Rocket motors (Solid propellant), Rocket cases), High-pressure research, Rupture, Tests, Pressure vessels, Nickel alloys, Maraging steels, Forging, Welds, Shear stresses, Roughness, Tensile properties, Fracture (Mechanics), Metallography.

This report presents a discussion of the results obtained from the hydroburst testing of E.A.F.B. case SN1. Case SN1 burst at a pressure of 1076 psig, corresponding to a Pr/t burst stress of 375,000 psi. A total of five, 6-inch diameter subscale burst tests using test bottles representing the same heats of material in the full scale cases are also discussed. The Pr/t test results on these bottles ranged from 346,000 psi to 375,000 psi, complimenting the highly successful full scale burst. A metallurgical analysis of the tested case and bottles was conducted and is presented to establish the mode of fracture origination and progression. (Author)

AD-600 756 Div. 27, 12
OTS price $6.60

Battelle Memorial Inst., Columbus, Ohio.
A STUDY OF THE INERTIA PUMP FOR USE IN THE EXTRATERRESTRIAL ENVIRONMENT.
Final rept.,
by J. W. Kannel, D. H. Thiel, W. C. Franke and E. M. Simons. Apr 63, 68p.
Contract AF33 657 8463, Proj. 8169, Task 816904
ASD TD63 374 Unclassified report

Descriptors: (*Space stations, Pumps), (*Pumps, Space stations), (*Liquid metal pumps, Space stations), Space environmental conditions, Liquefied gases, Liquid metals, Feasibility studies.

This study includes evaluations of possible fluids to be transferred in space, the suitability of the inertia pump to transfer these fluids, a layout design of an extraterrestrial inertia pump and a theoretical analysis of this pump. Two fluids which will be used in space are cryogenic liquids and liquid metals. An inertia pump capable of delivering the flow rates desired for the transfer of cryogenic liquids in space appears to be larger than a centrifugal pump of comparable capacity which makes it somewhat unattractive for this application. However, it does appear practical as an extraterrestrial liquid-metal pump. The weight of a liquid-metal inertia pump should be quite competitive with the weight of mechanical liquid-metal pumps and lighter than electromagnetic pumps with the same capacities. A layout design of a liquid-metal inertia pump was made. Various components incorporated in this design will require experimental evaluations. The theoretical analyses of the pump indicate that it should perform effectively and efficiently. (Author)

AD-600 831 Div. 27, 31
OTS price $5.00

Naval Boiler and Turbine Lab., Philadelphia, Pa.
COMBUSTION ENGINEERING, INCORPORATED, SINGLE FURNACE NATURAL CIRCULATION BOILER FOR DDG-15 CLASS,
by D. Hansen, W. Ferraris and R. Schell.
6 Mar 64, 357p.
NBTL B444 Unclassified report

Descriptors: (*Boilers, Marine surface propulsion), Performance (Engineering), Tests, Marine surface propulsion, Naval vessels (Combatant).

A Combustion Engineering single furnace integral superheater boiler, with accessories including automatic feedwater controls and air operated retractable superheater cavity soot blower, was evaluated to determine performance and general suitability for use on DDG-15 Class ships. Tests were conducted at steaming rates comparable to those of the ships for which the unit was designed to determine optimum return flow sprayer plates, burner performance, circulation characteristics, steam baffle efficiency, automatic feedwater regulator capabilities, superheater cavity retractable soot blower performance, and to evaluate the unit and its components under normal and emergency conditions. To correct performance deficiencies, refractory gas baffles were developed to increase superheater outlet temperature; additional screen tubes were installed to shield the superheater outlet pass and reduce tube metal temperatures in that pass; steam drum girth plates were modified to improve circulation; and minor improvements in the feedwater regulating valve and the superheater cavity retractable soot blower system were made. Following completion of all modifications the overall boiler performance was considered satisfactory. (Author)

28. PSYCHOLOGY AND HUMAN ENGINEERING

AD-600 036 Div. 28, 23
OTS price $.75

Army Personnel Research Office, Office of the Chief, Research and Development, Washington, D. C.
INFORMATION ASSIMILATION FROM SYMBOLIC DISPLAYS. AMOUNT OF INFORMATION PRESENTED AND REMOVED,
by Seymour Ringel and Frank L. Vicino. Mar 64, 23p.
Proj. 2J024701A723
APRO TRN139 Unclassified report

Report on Human Performance in Military Systems.

Descriptors: (*Memory, Psychometrics), (*Learning, Memory), (*Display systems, Memory), Army personnel, Data processing systems, Cybernetics, Decision making, Vision, Errors.

The Army's command information processing systems will end-produce maps, totes, and overlays on which situation information, intelligence data, and administrative support data are presented and continually updated. The study was conducted to determine how information assimilation is affected by amount of information presented and extent of information change introduced in updating. Slides containing military unit flag symbols such as might be depicted on maps and overlays were presented to 32 individuals. Four levels of amount of information were effected by varying the number of symbols--12, 16, 20, and 24--per slide. The initial presentation was followed by a second slide with a number of symbols--2, 4, 6, or 8--removed. Responses were analyzed in terms of accuracy and type of error.

Division 27 - PROPULSION SYSTEMS

AD-600 593 Div. 27
OTS price $3.00

Vidya, Inc., Palo Alto, Calif.
A STUDY OF SOLID-PROPELLANT ROCKET MOTOR EXPOSED MATERIALS BEHAVIOR.
Quarterly progress rept. no. 3, 1 Dec 63-29 Feb 64,
by John W. Schaefer, Raymond E. Lundberg, Robert M. Kendall and Peter A. McCuen. 9 Feb 64, 164p.
Contract AF04 611 9073, Proj. 3059, Tasks 305907, 305913
RTD TDR64 43 Unclassified report

Descriptors: (*Rocket motors (Solid propellant), Materials), (*Rocket motor nozzles, Materials), (*Programming (Computers)), Erosion, Digital computers, Reaction kinetics, Reinforcing materials, Theory, Graphite, Tungsten, Ablation, Heat transfer, Enthalpy, Gases, Entropy, Experimental data, Tests, Solid rocket propellant, Mixtures, Boundary layer, Temperature, Thermodynamics, Heat, Generators, Pressure, Refractory materials.

The objectives of the study: (a) To develop design tools, in the form of digital computer programs, for the nozzle designer to use for calculating the behavior of materials exposed to a solid-propellant rocket-exhaust environment. (b) To marshall existing theoretical methods, or develop new methods, to gain a better understanding of the fundamental mechanisms. Work was directed toward development of two digital-computer programs. One is applicable to materials such as graphite and tungsten, that, erode with one moving boundary or do not erode at all. The other applicable to the reinforced plastic materials that form a char layer. Effort in the areas of transient conduction, equilibrium chemistry, reaction kinetics, and mass transport, as applied to the solid-propellant rocket problem, is described in detail. (See also AD-428 437)

AD-600 608 Div. 27, 9
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
BLADELESS GUIDE VANE FOR CENTRIPETAL TURBINES,
by A. V. Gubarev and G. A. Fillippov. 13 May 64, 9p.
FTD TT64 141; TT 64 11698
Unclassified report

Unedited rough draft trans. of Energomashinostroenie (USSR) 1963, v. 9, no. 2, pp. 38-39.

Descriptors: (*Turbines, Guide vanes), (*Guide vanes, Turbines), Gas turbines, Gas flow, Vortices, Nozzles, USSR

Investigations into the static conditions of a bladeless guide vane showed a sufficiently high effectiveness. This made it possible to confirm that the use of these guide vanes in centripetal turbines permit much simpler production technology and to reduce assembly weight and size without decreasing efficiency. The developed methods of approximate calculation make it possible with sufficient accuracy to design a bladeless vane for a given output flow angle. Nonuniformity of flow angles obtained in the experiments with respect to the periphery behind the guide vane may be explained by the presence of deviations of the flow areas of the fabricated chamber from those calculated. (Author)

AD-600 609 Div. 27, 15, 17
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ANALOG STUDY OF THE EFFECT OF THERMAL CONDUCTIVITY OF A MATERIAL ON THE HEAT IN A TURBINE BLADE,
by J. Kunes and O. Vavroch. 4 May 64, 16p.
FTD TT64 146; TT 64 11699 Unclassified report

Unedited rough draft trans. of Strojirenstvi (Czechoslovakia) 1962, v. 12, no. 11, p. 842-846.

Descriptors: (*Turbine blades, Cooling), (*Thermal conductivity, Numerical analysis), (*Numerical methods and procedures, Nonlinear differential equations), (*Heat resistant metals & alloys, Thermal conductivity), Electric fields, Thermal stresses, USSR, Steel, Nickel alloys, Temperature.

In studying the problem of thermal fields in structural installations it was found that when solving this problem the effect of thermal conductivity changes of the material can be disregarded. Described is a method based on gradual analog approximations, which enable a substantial simplification of the mathematical chalenging exercise, on how to determine the thermal field with consideration of changes in thermal conductivity with the rising temperature of the material. A concrete example shows how such effect may appear in a cooled turbine blade. (Author)

AD-600 689 Div. 27, 30
OTS price $1.00

Redstone Scientific Information Center, Redstone Arsenal, Ala.
TORSION OF ROUND SHAFTS WITH VARIABLE DIAMETER,
by Rudolf Sonntag. 8 May 64, 40p.
RSIC 179; TT 64 11684
Unclassified report

Trans. of Zeitschrift fur Angewandte Mathematik und Mechanik (Germany) 1929, v. 9, no. 1, p. 1-22.

Descriptors: (*Shafts, Mechanical properties), (*Torque, Stresses), Mechanical engineering, Engine structures, Rotation, Shear stresses, Elasticity, Deformation, Failure (Mechanics), Mathematical analysis.

A simple approximation method is shown for the calculation of stress increases at the transition points of stepped or grooved shafts. The results of this method are well confirmed by the paper of Willers as well as by our own experiments. This method depicts the actual conditions for practically all technically important cases with a completely sufficient accuracy. (The average error is less than ±5%.) Somewhat larger deviations -- meaning higher computed maximum stresses -- will probably result for exceptionally abrupt transitions, i.e., in cases which are obviously dangerous and are therefore in practice of minor interest only, apart from the fact that they can always be avoided. (Author)

AD-600 745 Div. 27, 17, 30
OTS price $1.75

Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J.
DESIGN, DEVELOPMENT AND FABRICATION OF ULTRA-HIGH STRENGTH SOLID PROPELLANT MOTOR CASES.

AD-600 139 Div. 28
OTS price $.75

Michigan Univ., Ann Arbor.
BASES FOR PREFERENCES AMONG THREE-OUTCOME BETS,
by Sarah Lichenstein. May 64, 22p. P2909
Grant AF AFOSR192 63
Unclassified report

Descriptors: (*Decision making, Probability), Reasoning, Analysis of variance, Game theory, Psychometrics, Behavior.

This experiment compared the moment functions of a bet as predictors of choices among bets with the subjectively expected utility (SEU) maximization model. Bet parameters of Expected Value (EV), Variance (V), Skewness (Sk), and probabilities were independently varied in 182 3-outcome bets. Each of 12 Ss bid on each bet and played some bets for real money. Ss preferred high EV and low V, but had no preferences within Sk or probability levels. Sets of bets existed which were equal in all parameters; within such sets, Ss preferred bets with the largest least likely amount. The moment-function approach was rejected; the SEU model was not. A lexicographic ordering of variables was suggested. (Author)

AD-600 176 Div. 28, 12
OTS price $2.00

Aerojet-General Corp., Sacramento, Calif.
HUMAN RELIABILITY IN THE PERFORMANCE OF MAINTENANCE,
by Irl A. Irwin, Joel J. Levitz and Alvyn M. Freed. May 64, 71p. LRP317
Contracts AF04 694 424, AF04 647 521
BSD TDR63 218 Unclassified report

Descriptors: (*Performance (Human), Reliability), (*Guided missile personnel, Performance tests), Human engineering, Maintenance personnel, Rocket motors, Guided missiles, Guided missiles (Surface-to-surface), Performance tests.

A method for estimating the reliability of maintenance performance is developed and applied to tasks involved in scheduled maintenance for Titan II engines. The approach involves the combined use of ratings and empirically derived reliability figures. A modification of the design engineer's redundancy formula is developed for estimating the increase in human reliability achieved when two mechanics work together in the performance of a single maintenance task. This study demonstrates that highly consistent ratings of task-element-reliability can be obtained from groups of qualified raters. Plans for validating the human reliability estimates obtained during Category II testing at Vandenberg Air Force Base are described. Suggestions for further research and application of the findings are given. (Author)

AD-600 181 Div. 28
OTS price $2.25

System Research, Ltd., Richmond (England).
A STUDY OF GROUP DECISION MAKING AND COMMUNICATION PATTERNS UNDER CONDITIONS OF STRESS AND OVERLOAD, WHEN THE PARTICIPANTS ARE PERMITTED TO FUNCTION AS A SELF-ORGANISING SYSTEM.
Final technical rept., 1 Jan-31 Dec 63.
1964, 95p.
Contract DA91 591EUC2753
Unclassified report

Descriptors: (*Decision making, Group dynamics), (*Group dynamics, Decision making), Pattern recognition, Stress (Psychology), Social psychology, Learning, Reaction psychology, Social communication, Display systems, Communication systems.

Experiments on group decision making under conditions tat can be automatically and adaptively controlled are described. Pilot experiments were conducted with three-person groups, in which a trajectory-interception task was split into three sequentially dependent sub-tasks, detection, coding, and decision. The original design was modified to a two-person game consisting of two sub-tasks which could be assigned, jointly or severally to the two players in five different ways. Only three of the sub-task assignments were utilized. A strategy was designed to determine how these might be adaptively varied to counteract the effects of stress and overload. The strategy embodies two decision rules, one specifying the time of reassignment, and one the choice of reassignment. This strategy was tested and compared to weaker strategies embodying just one adaptive decision rule. Statistical analysis of the data showed that the two-rule strategy gives significant increases in efficiency, but weaker strategies are likely to be worse that the maintenance of fixed sub-task assignments. Whenever there is a reliable warming-up or settling-in period after sub-task reassignments, the time-course efficiency can be changed without raising the overall efficiency. (See also AD-428 615) (Author)

AD-600 296 Div. 28
OTS price $.50

Pittsburgh Univ., Pa.
DIFFERENTIAL RESPONSE TO APPRAISAL AND GOAL SETTING AS A FUNCTION OF SELF, INTERACTION AND TASK ORIENTATION.
Technical rept. 3,
by Bernard M. Bass. May 64, 18p.
Contract Nonr624 14
Unclassified report

Descriptors: (*Personality, Students), (*Motivation, Personality), (*Attitudes, Group dynamics), Psychometrics, Reaction (Psychology), Behavior.

Sixty graduate students met periodically for 15 weeks in training groups. Midway, half of the men were counseled individually 1 to 1 1/2 hours by a peer from the other half. The counselees were the men most extreme in scores in self, interaction or task-orientation. The counselors were the remaining men. Counseling was devoted either to appraising past performance or to setting future goals. Generally, self-oriented students were significantly less likely to agree with their counselors as to what had been discussed in counseling and to particularly favor past performance appraisal over future goal setting. (See also AD-408 128). (Author)

AD-600 319 Div. 28
OTS price $1.00

Kansas State Univ., Manhattan.
THE EVOLUTION OF PERCEPTUAL FRAMES OF REFERENCE.
Technical rept. nos. 17-20,
by William Bevan. Apr 64, 38p.
Contract Nonr363401
Unclassified report

It was found that: (1) accuracy of information assimilation decreased as the number of symbols was increased; (2) although the number of symbols removed in a single updating did not affect the accuracy of information assimilation, it did affect the type of error made--as more symbols were removed, increasingly more errors of omission than of commission were made; (3) individuals differed appreciably in their ability to assimilate the information presented; and (4) differences in performances appeared to be at least partially associated with age. Findings point to the advisability of keeping the amount of information in a single display to a minimum consistent with operational utility. (Author)

AD-600 037 Div. 28, 23
OTS price $.50

Army Personnel Research Office, Office of the Chief, Research and Development, Washington, D. C.
VALUES ASSOCIATED WITH MILITARY CAREER MOTIVATION,
by Leonard V. Gordon and Francis F. Medland.
Mar 64, 12p.
Proj. 2J024701A722
APRO TRN143 Unclassified report

Report on Selection and Behavioral Evaluation.

Descriptors: (*Army personnel, Leadership), (*Leadership, Psychometrics), (*Military psychology, Army personnel), Officer personnel, Motivation, Decision making.

The NCO Leaders Task is concerned with the development of measures of leadership by which to identify early in their Army career those men who have potential as effective combat leaders. The study reports on preliminary exploration of relationships between certain established dimensions of interpersonal values and decision to remain in or leave the service. Measure of six dimensions--Support, Conformity, Recognition, Independence, Benevolence, and Leadership--on the Survey of Interpersonal Values (SIV) were obtained on EM and officer trainee samples in the 5th and 10th week of Army service, respectively. Measures were analyzed in relation to desire to remain in the Army as expressed by the EM after 20 weeks' service and by officers after 15 weeks. For both officer and enlisted samples, three values were found to be predictive of career motivation. Officers who desired to remain tended to score higher on Conformity and Benevolence and lower on Independence; EM scored higher on Benevolence but lower on Independence and Support. Results suggest that measurement of values may contribute usefully to prediction of military career decision. (Author)

AD-600 038 Div. 28, 23
OTS price $1.50

Army Personnel Research Office, Office of the Chief, Research and Development, Washington, D. C.
PREDICTION OF OFFICER PERFORMANCE,
by Louis P. Willemin. Mar 64, 46p.
Proj. 2J024701A722
APRO TRR1134 Unclassified report

Descriptors: (*Officer personnel, Performance (Human)), (*Army personnel, Psychometrics), (*Leadership, Psychometrics), Test construction (Psychology), Military psychology.

The Officer Prediction Task, established within the U. S. Army Personnel Research Office (USAPRO), has a requirement to provide the Army with improved techniques and prerequisites for selecting officers who have aptitudes and other characteristics to meet demands for successful performance in different types of officer command responsibility. The study was centered on the differential prediction of officer performance in the technical, administrative, and combat areas of assignment. Validation of the Differential Officer Battery (DOB), a battery of experimental predictors administered in 1961-1962, is in progress. Situational criterion measures, five for each of the three fields, were developed and integrated into a regularly scheduled testing operation administered since July 1963 in a simulated MAAG setting at the Officer Evaluation Center (OEC), Fort McClellan. Initial statistical processing has begun. (Author)

AD-600 064 Div. 28
OTS price $4.00

Psychological Labs., Univ. of Georgia, Athens.
SHELTER OCCUPANCY STUDIES AT THE UNIVERSITY OF GEORGIA 1962-1963.
Appendices to final rept.
31 Dec 63, 262p.
Contract OCD OS62 226
Unclassified report

Descriptors: (*Shelters, Survival), (*Confinement (Psychology), Shelters), Civil defense systems, Reaction (Psychology), Psychophysiology, Physical fitness, Training, Medical examination, Universities, Stress (Psychology).

AD-600 106 Div. 28, 32
OTS price $.50

Research Center for Group Dynamics, Univ. of Michigan, Ann Arbor.
THE LEARNING OF BALANCED AND UNBALANCED SOCIAL STRUCTURES.
Technical rept. no. 27,
by Robert B. Zajonc and Eugene Burnstein.
15 Mar 64, 20p.
Contract Nonr1224 34, Proj. NR170 309
Unclassified report

Descriptors: (*Learning, Attitudes), (*Word association, Learning), Social psychology, Sociometrics, Emotions.

The theories of balance and dissonance which assume that balance, congruity, and consonance are the normal, expected, and desired state, and that it is easier to learn a balanced structure than an unbalanced one were tested on twelve volunteer college students. Six structures, three balanced and three unbalanced, were employed. Each structure involved an issue and two hypothetical men and an issue. The issues were Integration and Newsweek. These structures were arranged graphically and connected by arrows each of which constituted an item in the paired associates list. The six structures generated eighteen items. Of these items, nine required a positive response and nine a negative response. One group of subjects learned the six structures with Integration as the issue and the other group with Newsweek as the issue. An unbalanced structure was found more difficult to learn than a balanced one, but only when the issue was an important one. Negative relationships were found to be more difficult to learn than positive ones.

Braune and O. Fischer; Theoretical Fundamentals for a Mechanics of Living Bodies, by O. Fischer; The Human Motor, by J. Amar; and Space Requirements of the Seated Operator, by W. T. Dempster. (Author)

AD-600 646 Div. 28
OTS price $.50

North Carolina State Coll., Raleigh.
A REPLICATION OF PAIRED-ASSOCIATE LEARNING AS A FUNCTION OF S-R SIMILARITY.
Technical rept. no. 8,
by Slater E. Newman. May 64, 4p.
Contract Nonr48608
Unclassified report

Descriptors: (*Performance tests, Transfer of training), (*Psychometrics, Learning), (*Learning, Psychometrics), Students.

This experiment replicated the finding that paired-associate learning is interfered with when the same items occur as S-terms and R-terms. It demonstrated also that learning is interfered with when S-terms share with R-terms all the same letters but no items. (See also AD-600 842). (Author)

AD-600 647 Div. 28
OTS price $.50

North Carolina State Coll., Raleigh.
EFFECTS OF PAIRING TIME AND TEST-TIME ON PERFORMANCE DURING AND AFTER PAIRED-ASSOCIATE TRAINING.
Technical rept. no. 9,
by Slater E. Newman. May 64, 5p.
Contract Nonr48608
Unclassified report

Descriptors: (*Performance tests, Time), (*Training, Performance tests), (*Psychometrics, Time), Learning.

The experiment studied the effect of pairing time and of test-time on performance during and immediately after paired-associate training. The length of the pairing interval and of the test-interval were independently varied. A pairing-test procedure was used, each of the 12 pairing trials being followed by a test-trial. The main dependent variables were the number of correct responses during the 12 test-trials and during a 13th test administered immediately after paired-associate training. (See also AD-600 646). (Author)

AD-600 648 Div. 28
OTS price $.50

North Carolina State Coll., Raleigh.
ISOLATION EFFECTS WHEN PAIRED-ASSOCIATES ARE PRESENTED SERIALLY.
Technical rept. no. 10,
by Slater E. Newman and G. Alfred Forsyth.
May 64, 5p.
Contract Nonr48608
Unclassified report

Descriptors: (*Learning, Performance tests), (*Transfer of training, Psychometrics), Reaction (Psychology).

The experiment studied the effect of isolating one or both terms of a pair on learning the pair. The pairs were presented in the same order on each trial, the pair with the isolated term(s) appearing near the middle of the list. Isolation led to faster learning of the pair, but did not affect the rate of learning the entire list. It is proposed that one effect of isolation is a change in the sequence in which S attacks the items of a list, the isolated item being attacked sooner than if it were not isolated. (See also AD-600 647) (Author)

AD-600 649 Div. 28
OTS price $.50

North Carolina State Coll., Raleigh.
SERIAL POSITION AS A CUE IN LEARNING: THE EFFECT OF TEST-RATE.
Technical rept. no. 11,
by Slater E. Newman. May 64, 8p.
Contract Nonr486 08
Unclassified report

Descriptors: (*Learning, Performance tests), (*Psychometrics, Learning), Reaction (Psychology).

In the experiment Ss were tested at either a 2-, 6- or 10-sec. rate and Ss were given 15 pairing trials, a test following the 5th, 10th and 15th. A predicted significant interaction occurred between Presentation-Order (SS vs. SD) and Test-Rate, the difference between SS and SD groups being directly related to test-rate. (See also AD-600 648) (Author)

AD-600 653 Div. 28, 16, 30
OTS price $.50

Aeronautical Computer Lab., Naval Air Development Center, Johnsville, Pa.
A PROPOSED METHOD OF ERROR SCORING CONTINUOUS TASKS IN PSYCHOLOGICAL AND PHYSIOLOGICAL EXPERIMENTS.
Technical rept.,
by A. Futterweit. 27 Apr 64, 15p.
NADC AC 6405 Unclassified report

Descriptors: (*Performance (Human), Errors), (*Psychometrics, Errors), (*Errors, Psychometrics), Psychophysiology, Bionics, Human engineering, Probability, Measure theory, Data processing systems, Digital recording systems, Programming, Computers.

A method of error scoring is proposed utilizing error amplitude probability density functions. The potential benefits of this method are discussed in the introduction. The technique for mechanizing the proposed method is presented in detail from data acquisition to final output and presentation of processed data. (Author)

AD-600 702 Div. 28
OTS price $1.00

Educational Testing Service, Princeton, N. J.
DIFFICULTY AND OTHER CORRELATES OF CRITICALNESS RESPONSE STYLE AT THE ITEM LEVEL.
by Lawrence J. Stricker. May 64, 39p. RB64 25
Contract Nonr2338 00, Proj. NR151 182
Unclassified report

Descriptors: (*Achievement tests, Psychometrics), (*Reaction (Psychology), Achievement tests), Personality, Factor analysis, Reports.

The study examined the relationship between the difficulty of items on an achievement-type test of report writing and (a) the items' correlations with the test's criticalness response style score, and (b) the items' correlations with the

Descriptors: (*Visual perception, Psychomotor tests), (*Psychomotor tests, Visual perception), Stimulation, Effectiveness, Reaction (Psychology), Reflexes, Learning, Sensitivity, Touch, Dynamics, Torque.

This report includes: ANCHOR EFFECTIVENESS AS A FUNCTION OF STIMULUS VARIATION ON AN INCIDENTAL DIMENSION, by Joan Faye Pritchard and William Bevan. April 1964 (Technical Report no. 17, 1964). FORMS OF ORALLY-PRESENTED KNOWLEDGE OF RESULTS AND SERIAL REACTION TIME, by Don Hardesty and William Bevan. April 1964 (Technical Report no. 18, 1964). VIGILANCE PERFORMANCE WITH A QUALITATIVE SHIFT IN REINFORCERS, by William Bevan and Edward D. Turner. April 1964 (Technical Report no. 19, 1964). TORQUE: A NEW DIMENSION IN TACTILE-KINESTHETIC SENSITIVITY, by Burrton Woodruff and Harry Helson. April 1964 (Technical Report no. 20, 1962). (See also AD-414 943).

AD-600 438 Div. 28, 18
OTS price $.75

Michigan State Univ., East Lansing. Coll. of Communication Arts.
THE FALLOUT PROTECTION BOOKLET: (III) A METHODOLOGICAL COMPARISON OF PRE-TEST RESPONSES OF THOSE WHO RESPONDED, REFUSED, OR WERE NOT REACHABLE ON THE POST-TEST.
Communication research rept.,
by Dan Costley and David K. Berlo. Apr 64, 23p.
Contract OCD OS62 19
Unclassified report

Descriptors: (*Civil defense systems, Attitudes), (*Nuclear warfare), Handbooks, Shelters, Public opinion, Survival, Sociometrics.

A study was made of the impact of the 'Fallout Protection' booklet which was published by the OCD in December of 1961. While collecting data specific to that objective, useful information relevant to public information about and attitude toward civil defense was collected. Report #1 presented data on the accuracy of public knowledge about nuclear attack and civil defense, the favorability of public attitudes toward civil defense measures, other estimates of the public as to the threat of nuclear war and the relative effectiveness of various shelter inducements and inducement agents, and indices of public exposure to shelter information. Report #1 also analyzed attitudinal and demographic correlates of shelter knowledge, beliefs, and plans. Report #2 presented data from a comparative analysis of attitudinal and information levels of respondents who had been divided into four categories of interest with respect to constructing family shelters. This report presents the findings of a comparison of pre-test responses of those who (a) responded, (b) refused, or (c) were not reachable on the post-test. (See also AD-404 512). (Author)

AD-600 441 Div. 28, 23
OTS price $1.00

Tufts Univ., Medford, Mass.
BELIEF STATES: A PRELIMINARY EMPIRICAL STUDY,
by Thornton B. Roby. Mar 64, 39p.
Contracts AF19 628 2450, Nonr494 15, Proj. 4690, Task 469003
ESD TDR64 238 Unclassified report

Descriptors: (*Attitudes, Psychometrics), Military psychology, Decision making, Probability.

The 'belief state,' as a technique for describing beliefs, attitudes and judgments, is proposed here as an important adjunct to psychological research, especially in the areas of decision making by individuals and by groups. The 'belief state' is defined as a device for representing in probabilistic form an exact quantitative description of the information or beliefs an individual has about possible alternative conditions of the external world. The present study investigates the feasibility of measuring belief states in a simple laboratory situation, and of ascertaining by various statistical tests the degree to which these empirical measures conform to the normative standard of a perfect Bayesian calculation. It is shown that Ss in general depart from the standard in certain properties; that there are reliable individual differences among Ss' belief state measures as an apparent result of increasing experience with the task. Several suggestions are offered for future investigations of these measures under more closely controlled conditions. (Author)

AD-600 585 Div. 28, 16
OTS price $1.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
AN ANALYSIS OF CONDITIONED REFLEXES AND OF THE THOUGHT PROCESSES OF THE HUMAN BRAIN,
by A. V. Napalkov and N. I. Bobneva. 26 Mar 64, 31p.
FTD TT64 184; TT 64 11691
Unclassified report

Trans. of Voprosy Psikhologii (USSR) 1962, v. 8, no. 6, p. 40-54.

Descriptors: (*Conditioned reflex, Reasoning), (*Reasoning, Conditioned reflex), (*Psychophysiology), (*Cybernetics), Models (Simulations), Brain, Pattern recognition, *Environment, Reactions (Psychology), Human engineering.

The current status of research on mental mechanisms was surveyed. Three series of experiments, using models, attempting to analyze the information processes which take place in the brain during the functioning of a chain of reflexes are described. A bibliography of 32 items is included.

AD-600 618 Div. 28
OTS price $5.00

Pennsylvania Univ., Philadelphia. Graduate School of Medicine.
HUMAN MECHANICS. FOUR MONOGRAPHS ABRIDGED,
by Wilton Marion Krogman and Francis E. Johnston. Dec 63, 387p.
Contract AF33 616 8091, Proj. 7184, Task 718408
AMRL TDR63 123 Unclassified report

Report on Human Performance in Advanced Systems.

Descriptors: (*Anthropometry, Human engineering), (*Human engineering, Biophysics), Motor reactions, Musculoskeletal system, Gravity, Dynamics, Performance (Human).

The report condenses four important monographs in the field of applied human mechanics: The Centers of Gravity in the Human Body, by W.

30. RESEARCH AND RESEARCH EQUIPMENT

AD-600 009 Div. 30
OTS price $.75

Laboratory for Electroscience Research, New York Univ., N. Y.
CUMULATIVE CODES AS VARIABLE REDUNDANCY CODES.
Scientific rept. no. 15,
by Jack Keil Wolf. Dec 63, 25p. Rept. no. NYU TR400 87
Contract AF19 6168, Grant AF AFOSR499 64, Proj. 4610, Task 461003
AFCRL 64 11 Unclassified report

Descriptors: (*Decoding, Errors), (*Errors, Decoding), Computers, Programming (Computers), Control systems, Feedback, Coding, Mathematical analysis.

A cumulative decision feedback system is considered whereby the digits are decoded on the basis of all the digits in all of the repeated blocks. If an (n,k) binary group code is repeated (N-1) times, the resultant digits are considered as nN-tuples derived from an (nN,k) code. The parity check matrix, minimum distance and generator polynomial (for cyclic codes) are determined for the (Nn,k) codes in terms of the respective quantities for the (n,k) code. A method for partitioning the error detection and correction capabilities of the (Nn,k) code. A method for partitioning the error detection and correction capabilities of the (Nn,k) code is suggested on the basis of a constant failsafe probability criterion. (Author)

AD-600 010 Div. 30, 9
OTS price $.75

Princeton Univ., N. J.
FURTHER DEVELOPMENT OF A GRAPHITE HEATER FOR HIGH PRESSURE NITROGEN OPERATION,
by I. E. Vas and J. K. Harvey. Oct 63, 28p.
AER669
Grant AF AFOSR112 63
AFOSR 5440 Unclassified report

Descriptors: (*Hypersonic wind tunnels, Heaters), (*Nitrogen, Heating), (*Heating elements, Graphite), High pressure research, Stagnation point, Temperature, Pressure vessels, Thermocouples.

An experimental study was conducted to extend the operation of a graphite resistance nitrogen heater to pressures above the 1000 psi previously obtained. Using a somewhat modified design, a single pass spiral heater element as fabricated and tested at 5000 psi and 5000 R. Test runs of 5 to 15 minutes were carried out with total operating times at elevated temperatures and pressure exceeding several hours using the same element. The temperature was determined by the mass flow technique and checked against a thermocouple installed in the stagnation chamber. (Author)

AD-600 013 Div. 30
OTS price $2.75

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
EVALUATING THE LOGICAL DESIGN OF THE PROBLEM ORIENTED SYMBOL PROCESSOR.
Final rept.,
by R. F. Schauer and J. E. Meggitt. 1 Nov 63, 147p.
Contract AF19 628 3257, Proj. 850F0000
AFCRL 64 198 Unclassified report

Descriptors: (*Digital computers, Control sequences), (*Programming (Computers), Digital computers), (*Computer logic, Digital computers), Programming languages, Compilers, Programming (Computers).

This report is a description of the implementation of the Adam machine by means of microprograms and a small micro computer. Included are a general description of the philosophy and methods, and a detailed description of each of the microprograms.

AD-600 014 Div. 30
OTS price $5.00

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
EVALUATING THE LOGICAL DESIGN OF THE PROBLEM ORIENTED SYMBOL PROCESSOR. ADAM MICROPROGRAM DECKS AND 7094 INTERPRETIVE PROGRAM ASSEMBLIES.
Final rept., appendix,
by R. F. Schauer and J. E. Meggitt. 1 Nov 63, 337p.
Contract AF19 628 3257, Proj. 850F0000
AFCRL 64 198, app.
Unclassified report

Descriptors: (*Digital computers, Programming (Computers)), (*Programming (Computers), Digital computers), (*Compilers, Computer logic), Simulation.

This appendix includes the microprogram assembly decks, and the 7094 interpretive programs used to simulate the ADAM microcomputer. There are nine interpretive programs: (1) INTRC; (2) LOADF; (3) ENDPR; (4) MICPR; (5) INPF *MAIN*; (6) PRINT; (7) TRACE; (8) SETAB; and (9) INSEQ. (Author)

AD-600 027 Div. 30
OTS price $2.25

Army Electronics Research and Development Agency, Fort Monmouth, N. J.
A COMPLETE FLOATING DECIMAL INTERPRETIVE SYSTEM FOR THE LGP-30 ROYAL McBEE DIGITAL COMPUTER,
by Robert Lefker. Dec 63, 95p.
Task 1A010501B010
AELRDL TR2419 Unclassified report

Descriptors: (*Compilers, Digital computers), (*Programming (Computers), Digital computers), (*Digital computers, Computer logic), Programming languages.

An interpretive system which transforms the LGP-30 into a three address, floating decimal, general-purpose computer primarily suited for scientific and engineering calculations is described in this report. The system is complete in that all mathematical, logical, input-output, and tracing operations normally called for in such calculations can be performed within the system without reference to the basic machine language of the LGP-30. Ease of use, highest possible speed of arithmetic, inclusion of the most frequently used logical operations, and the greatest range in the transcendental functions have been the main general considerations in developing the system. The user of the system need only concern himself with sections entitled General Considerations through Programming, while those interested in the structure

test's content score. Item readability and item format variables were also analyzed. The major findings were that (a) the items' difficulty was related to their correlations with the content score and unrelated to the items' correlations with the response style score; (b) the items' location in the test was generally related to their correlations with the response style score, and unrelated to the other variables; and (c) the readability indexes were not related to the three basic item variables. (Author)

AD-600 782 Div. 28, 23
OTS price $.50

Personnel Research Lab. (6570th), Aerospace Medical Div., Lackland AFB, Tex.
DEVELOPMENT AND STANDARDIZATION OF THE AIR FORCE OFFICER QUALIFYING TEST-64,
by Robert E. Miller and Lonnie D. Valentine, Jr.
Mar 64, 20p.
Proj. 7717, Task 771706
PRL TDR64 6 Unclassified report

Descriptors: (*Air force personnel, Aptitude tests), (*Aptitude tests, Air force personnel), (*Officer personnel, Aptitude tests), Performance (Human), Military training, Military personnel, Mathematical prediction, Psychometrics, Standardization, Selection.

A revised form of the Air Force Officer Qualifying Test, AFOQT-64, replaced AFOQT Form G in September 1963. The new form is more easily administered and scored than earlier forms. It contains 542 items organized into 13 subtests. Scores are obtained for the usual AFOQT composites: Pilot, Navigator-Technical, Officer Quality, Verbal, and Quantitative. In addition, the test can be scored for two special composites (Academic and Career Potential) constructed for use only in the AFROTC Officer Education Program. Item statistics, reliability estimates, and distribution statistics for the composite scores are reported. The composites were scaled with reference to equivalent Project TALENT composites. Instead of the USAF Academy candidate population, previously used in scaling AFOQT scores, the normative base was the nationwide 12th grade male population. (Author)

AD-600 804 Div. 28
OTS price $2.25

Aerospace Medical Research Labs., (6570th), Wright-Patterson AFB, Ohio.
A BIBLIOGRAPHY OF REPORTS ISSUED BY THE BEHAVIORAL SCIENCES LABORATORY: ENGINEERING PSYCHOLOGY, TRAINING PSYCHOLOGY, ENVIRONMENTAL STRESS, SIMULATION TECHNIQUES, AND PHYSICAL ANTHROPOLOGY,
comp. by Lavon E. Trygg and Lucille E. Kelsey.
Apr 64, 89p.
Unclassified report

Descriptors: (*Bibliographies, Behavior), (*Psychology, Bibliographies), (*Anthropology, Bibliographies), Training, Stress (Psychology), Environment, Simulation.

AD-600 823 Div. 28, 15
OTS price $1.75

Institute for Research, State College, Pa.
OPTIMAL STRATEGIES AND HUMAN BEHAVIOR IN FUNGUS-EATER GAME 4,
by Jun-ichi Nakahara and Masanao Toda. Feb 64, 66p.
Contracts AF19 628 2450, AF19 628 2968, Proj. 4690, Task 469003
ESD TDR64 237 Unclassified report

Descriptors: (*Decision making, Digital computers), (*Game theory, Decision making), Behavior, Bionics.

Fungus-eater games yield a class of sequential decision tasks which involve both means objects and end objects in a not-too-unrealistic fashion. Study of human strategies and of the optimal strategies in these games may improve our understanding of complex dynamic decision tasks. The optimal strategy for the fourth fungus-eater game, which depends upon the level of fungus storage, is derived and the behavior of human playing this game is reported. (Author)

AD-600 858 Div. 28, 15, 30
OTS price $2.60

Duntley (S.Q.), La Jolla, Calif.
STUDIES OF MATHEMATICAL MODELS OF VISUAL PERFORMANCE CAPABILITY.
Rept. no. 1,
by James L. Harris. Jan 63, 23p.
Contract NObs86012
Unclassified report

Descriptors: (*Mathematical models, Visual perception), (*Visual perception, Mathematical models), (*Psychometrics, Functions), Vision, Thresholds (Physiology), Mathematical prediction, Target recognition.

This report describes work on a part of the USAF's Visual Target Classifier program (T76240). It summarizes the pertinent results to date of an extended series of interrelated studies of mathematical models of visual performance capability. The starting point for the studies is a derivation of an analytic expression for the psychometric function. The subsequent studies involve the use of the analytic psychometric function as a tool for the prediction of the results of vision experiments which either have been performed or could be performed. The capability of making such predictions constitutes an important forward step toward an operational Visual Target Classifier System. In addition to the prediction of visual thresholds, the model can be used to explore the significance of currently employed techniques for the processing of experimental vision data. (Author)

29. QUARTERMASTER EQUIPMENT AND SUPPLIES

AD-600 528 Div. 29
OTS price $.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
TEMPORARY POLAR STRUCTURES - MODIFIED T-5 BARRACKS.
Final rept.,
by G. E. Sherwood. 21 May 64, 25p.
Task Y F015 11 01 149
NCEL R308 Unclassified report.

Descriptors: (*Shelters, Prefabricated buildings), (*Prefabricated buildings, Polar regions), Heating plants, Glass textiles, Military personnel.

This report describes the redesign of the Army's T-5 Arctic Building for use as a barracks in polar regions. The modified building is 28 feet wide, has a 9-foot ceiling, and is expandable in length on a 4-foot module. A prototype 28- by 56-foot building was evaluated for its suitability as the basic building for the temporary polar camp developed by the Laboratory. (Author)

digital computers, Communication theory, Artificial intelligence, Documentation, Classification, Language.

AD-600 113 Div. 30
OTS price $3.50

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
SOME PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION.
Final rept., vol. 1, 1 Jan-31 Dec 63,
by Manfred Kochen. 2 Apr 64, 213p.
Contract AF19 628 2752, Proj. 5632, Task 563205
AFCRL 64 87 Unclassified report

Descriptors: (*Information retrieval, Programming languages), (*Data storage systems, Communication theory), (*Data processing systems, Communication theory), (*Programming languages, Programming (Computers)), Memory, Artificial intelligence, Bionics, Indexes, Dictionaries, Subject indexing, Learning.

Contents: An adaptive system for directly recording and retrieving information in simple, formal, english-like sentences; A description of an experimental information center and the language Query; Total information systems in planning and alerting; Working system for research in simulation of concept learning; Toward information systems science: information flow patterns and self-regulating mechanisms in the natural settings of libraries; Preliminary operational analysis of a computer-based, on-demand document retrieval system using coordinate indexing; Systems of orientation: a preliminary conceptualization; A model for the process of learning to comprehend; Methodology for research in concept-learning; Construction of a growing thesaurus by conversational interaction in a man-machine system; and Evaluation of bias in the removal of edges from a completely connected graph with an application to comparison of thesauri.

AD-600 117 Div. 30, 8
OTS price $3.00

International Business Machines Corp., Rockville, Md.
OPTIMIZED DIGITAL AUTOMATIC MAP COMPILATION SYSTEM.
Interim rept. no. 4, 10 Feb 63-10 Feb 64.
10 Mar 64, 161p.
Contract DA44 009AMC111X, Proj. 8T35 14 001 07
Unclassified report

Descriptors: (*Digital systems, Mapping), (*Mapping, Compilers), (*Analog-digital computers, Stereoscopes), Photogrammetry, Surveying, Programming (Computers), Electronic scanners, Optimization, Digital computers.

The primary purpose of the DAMC project is to optimize system hardware and computer programs developed and to develop and evaluate alternate correlation techniques. The objective is to prove conclusively the concept of digital map compilation. The system consists of a photo-digitizer unit for scanning and digitizing a pair of stereo aerial diapositives, specially written computer programs for use on an IBM 7090/7094 Computer to perform rectification, correlation, and ortho-correction on the digital photo data, and a photomap printer unit for printing the rectified photo and orthophotomap with or without contour and grid tic information. (Author)

AD-600 146 Div. 30, 9, 12
OTS price $1.25

Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
TEMPERATURE EFFECTS ON THE CAPTURE COEFFICIENTS OF SIX COMMON GASES,
by J. P. Dawson. May 64, 43p.
Contract AF40 600 1000, Proj. 8951, Task 895104
AEDC TDR64 84 Unclassified report

Descriptors: (*Cryopumping, Gases), (*Space environmental conditions, Test equipment), Cryogenics, Nitrogen, Argon, Carbon compounds, Monoxides, Nitrogen compounds, Oxides, Carbon dioxide, Vacuum apparatus, Velocity, Mathematical prediction, Molecular properties, Temperature, Surface temperatures, Experimental data, Equations.

The effects of gas and cryosurface temperature on the capture coefficient of six gases are discussed. The gas temperature effect is interpreted by the critical velocity model, and the cryosurface temperature effect is qualitatively explained by the potential field model. The possible error involved when these results are extrapolated to higher gas temperatures is also discussed. Experimental results are presented for the cryopumping rates of nitrogen, argon, carbon monoxide, nitrous oxide, oxygen, and carbon dioxide over 10 to 25 K cryosurfaces and a gas temperature range of from 77 to 400 K. (Author)

AD-600 160 Div. 30
OTS price $10.00

Office of Aerospace Research, Washington, D. C.
OAR CUMULATIVE INDEX OF RESEARCH RESULTS.
Rept. for Jan 59-Dec 62.
1964, 791p.
OAR 64 1 Unclassified report

Descriptors: (*Indexes, Aeronautics), (*Air Force research, Indexes), Bibliographies.

AD-600 238 Div. 30, 31
OTS price $2.60

David Taylor Model Basin, Washington, D. C.
SIMULATION OF A LONG-CRESTED GAUSSIAN SEAWAY.
Research and development rept.,
by Michael C. Davis. Apr 64, 23p.
DTMB 1755 Unclassified report

Descriptors: (*Model basins, Water waves), (*Water waves, Simulation), (*Ocean models, Water waves), Ocean waves, Models (Simulation), Control systems, Hydraulic systems, Analog computers, Statistical processes, Programming (Computers).

The report concerns the realistic simulation of irregular long-crested seas in the Harold E. Saunders Maneuvering and Seakeeping Facility. Random Gaussian seaways which approximated the Neumann spectral shape were produced for model testing by use of an electrohydraulic control system for wave generation. Techniques and difficulties associated with the use of an analog computer for wavemaker control are discussed. Plans for further development and extension to directional sea simulation are presented. (Author)

AD-600 242 Div. 30, 12
OTS price $2.75

System Development Corp., Santa Monica, Calif.
SCF COMPUTER PROGRAM SYSTEMS MANUAL, UTILITY

of the system will find it described in the sections entitled Internal Structure of the System. (Author)

AD-600 040 Div. 30, 7
OTS price $3.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
WIRE-RESISTANCE STRAIN GAGES AND THEIR APPLICATION,
by A. M. Turichin and P. V. Novitskii. 20 Jan 64, 246p.
FTD TT63 729; TT64 11633 Unclassified report

Unedited rough draft trans. of mono Provolochnye Preobrazovateli i Ikh Tekhnicheskoe Primenenie, Moscow/Leningrad, 1957, 171p.

Descriptors: (*Strain gages, Reviews), Wire, Resistance (Electrical), Materials, Deformation, Stresses, Circuits, Measuring devices (Electrical and electronic), Theory, Calibration, Construction, USSR.

The book deals with the theory, construction and practical application of wire-resistance strain gages. It is intended for engineering and scientific workers who in their work use wire-resistance strain gages for measuring mechanical deformation, stress, and other mechanical quantities.

AD-600 047 Div. 30
OTS price $3.00

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
SOME PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION.
Final rept., Vol. II, 1 Jan-31 Dec 63,
by Manfred Kochen. 2 Apr 64, 184p.
Contract AF19 628 2752, Proj. 5632, Task 563205
AFCRL 64 87 Unclassified report

Descriptors: (*Data processing systems, Communication theory), (*Communication theory, Data processing systems), (*Information retrieval, Learning), Programming (Computers), Data storage systems, Documentation, Memory, Language.

The problem of representing, storing, recalling and processing of relevant information in the increasingly complex environment of an organism were studied by simulation based on list processing and by theoretical investigation drawing on sociology and psychology of cognition, engineering studies of semi-automated library systems, and mathematical theory of graph and automation. The following accomplishments were made: progress toward a logical structuring of information science; classification of types of discourse, modelling of an information system in terms of memory, processor and comprehender subsystems governed by self-regulatory principles; operational analysis of special information systems; specification and construction of computer programs for concept and language learning; critical survey of associative memories; key-address transformations for file organization; and clustering algorithms based on measures of relevance. (Author)

AD-600 079 Div. 30
OTS price $.75

Stanford Research Inst., Menlo Park, Calif.
A SIMPLE MODEL OF A PATTERN RECOGNITION SYSTEM.
Technical note 1,
by D. J. Hall. Apr 64, 28p. SRI
Contract D 36 039AMC03247E, SRI Proj. 4565
Unclassified report

Descriptors: (*Pattern recognition, Models (Simulations)), (*Bionics, Simulators), Design, Operation.

This model is to be used to demonstrate the functional structure of a learning machine or pattern recognition system that is similar in basic principle to the learning machine recently designed and constructed at SRI. In addition, the model shows the important role that mask design plays. A specific method for selecting ''efficient'' masks for this model, by computer simulation, is also presented. The model is a highly simplified and therefore not very close approximation to the learning machine, MINOS II. It can be expected to discriminate only among the three letters of the alphabet with which it has been trained. The paper model displays many of the fundamental features and logical-system design principles encountered in the full-scale machine, which is capable of performing tasks more interesting than recognizing three free-hand letters of the alphabet. The model exhibits the ability to distinguish between different classes (discrimination), and to ignore variations within a class (generalization), which are the basic properties of a pattern recognition system. (Author)

AD-600 092 Div. 30, 32
OTS price $1.00

Army Frankford Arsenal, Philadelphia, Pa.
CATALOGUING AND RETRIEVAL OF ENVIRONMENTAL INFORMATION: A STATEMENT OF THE PROBLEM,
by Maurice H. Simpson. 20 Apr 64, 32p.
Proj. 1A025001A622 19 07
AFA R1713 Unclassified report

Descriptors: (*Information retrieval, Scientific research), (*Environment, Scientific research), Data processing systems, Data storage systems, Environmental tests, Engineering, Subject indexing.

The report describes the extent of the environmental information retrieval, storage and dissemination problem. It discusses the interrelated elements of the problem of general information needs and evaluation of natural and induced environments, and the specific needs concerning the effects of environmental stresses as related to when, where, and how equipment is to be used, transported, stored and handled. Added to the discussion are the need for standardization of environmental terminology, test methods, and procedures; reliability, failure analyses and modes of failure; and the problems of quantity and quality of input information. Desirable criteria for a usable environmental information retrieval, storage and dissemination system are developed in the report. (Author)

AD-600 110 Div. 30
OTS price $4.60

Air Force Office of Scientific Research, Washington, D. C.
INFORMATION SCIENCES 1963.
Annual rept.
Jan 64, 47p.
AFOSR 64 0101 Unclassified report

Descriptors: (*Information retrieval, Scientific research), (*Bibliographies, Information retrieval), Computers, Analog-

given contour is represented by a 'chain' of elements that in sequence trace out the contour path. The correlation technique permits a comparison between two contours without regard to relative orientation or scale. It is based directly on the intrinsic curvature properties of contour-line patterns. An algorithm for forming correlation sequences is developed and programmed for a digital computer. Results obtained by correlating some sample contours are discussed. (Author)

AD-600 284 Div. 30, 5, 18, 32
OTS price $2.75

Sylvania Electronic Systems, Needham, Mass.
MILDATA STUDY. A FEASIBILITY STUDY OF FUTURE MILITARIZED DIGITAL COMPUTER REQUIREMENTS.
Quarterly progress rept. no. 2, for period ending 31 Jan 64.
31 Jan 64, 134p.
Contract DA36 039AMC03276E
Unclassified report

Descriptors: (*Data processing systems, Military requirements), (*Digital computers, Data processing systems), (*Information retrieval, Military requirements), Design, Reviews, Feasibility studies.

This report documents the progress to date on the system organization studies and hardware techniques projection phases of the MILDATA Study. Topics covered under system organization studies include: Survey of software problems in multiprocessor configurations, such as interchangeability of modules, memory allocation and protection, executive control requirements, and intermodule switching problems. Development of system performance evaluation and design methodology in the areas of cost-effectiveness of high speed memories, feasibility of common processor design, and reliability analysis of modular configurations. Progress in hardware techniques projection is reported in peripheral equipment, memory, control processor logic, packaging, and wiring techniques, system integration problems, and the long-range impact of new device technology on system organization. (Author)

AD-600 289 Div. 30
OTS price $2.25

Computer Sciences Lab., Northwestern Technological Inst., Evanston, Ill.
TIME-OPTIMAL CONTROL OF DISCRETE SYSTEMS SUBJECT TO INPUT SATURATION.
Technical rept.,
by J. T. Tou and W. J. Hankley. May 64, 94p.
NTI CSL TR105
Contract Nonr1228 23, Grant NSF G24900, Proj. NR049 172
Unclassified report

Descriptors: (*Digital computers, Design), (*Control systems, Optimization), Time, Programming (Computers), Mathematical analysis.

One of the basic problems in the design of information systems is that of time-optimal control. Determination is necessary of an optimal control law which will take a dynamic process from some initial state to a prescribed desired state in the shortest possible time subject to various constraints. The report presents a practical solution to the optimization problem subject to control-signal saturation, by extending the method of coordinate transformation. The design of the on-line digital controller is developed into a control algorithm which may be programmed on a general purpose digital computer or mechanized in a special-purpose computing device. (Author)

AD-600 310 Div. 30, 15
OTS price $1.50

Laboratory for Electroscience Research, New York Univ., N. Y.
A CRITERION FOR QUANTIZATION OF PLANAR CONTOURS.
Technical rept.,
by Jeremy M. Glass. Feb 64, 54p. NYU TR400 91
Grants AF AFOSR62 152, AF AFOSR24 63
AFOSR 64 0940 Unclassified report

Descriptors: (*Data processing systems, Digital computers), (*Graphics, Data processing systems), (*Data transmission systems, Geometric forms), Curve fitting, Differential equations, Calculus of variations, Programming (Computers).

A criterion is presented for choosing the grid size used when planar contour curves are encoded in digital form. The criterion is based on representing the curves by flexed, thin elastic beams and measuring the corresponding strain energy. This energy is compared with that obtained from a 'smoothest possible' curve, or minimum-energy curve, which is shown to be uniquely determined by the quantized data. This minimum-energy curve serves as a reconstructed approximation to the original curve. The energy difference between the two curves, which varies with the grid size, is used as a basis for deciding how well the quantized data represent the original curve. In particular, the criterion requires that the minimum-energy curve generated from the quantized data reproduce the highest strain-energy density sections of an original curve to within some prescribed tolerance. (Author)

AD-600 331 Div. 30
OTS price $1.00

Stanford Research Inst., Menlo Park, Calif.
GRAPHICAL DATA PROCESSING RESEARCH STUDY AND EXPERIMENTAL INVESTIGATION.
Quarterly progress rept. no. 2, 1 Sep-31 Dec 63, by A. E. Brain and S. W. Miller. Jan 64, 33p.
Rept. no. 14
Contracts DA36 039AMC03247E, DA36 039sc78343, Proj. 3A99 22 001
Unclassified report

Descriptors: (*Graphics, Data processing systems), (*Information retrieval, Graphics), (*Data processing systems, Pattern recognition), Computers, Optical equipment, Design, Military requirements.

Modifications have been made to the design of the 1000-image preprocessor to improve the signal-to-noise ratio where this was marginal, and to provide better integration of the light transmitted by the masks. The study of the interface problem between the Burroughs B-5000 and MINOS II infers that cooperation between the two machines on a time-sharing basis is practical. The ramp generators used in the weight-changing algorithm and in the 100-image preprocessor are discussed in detail. (Author)

AD-600 345 Div. 30
OTS price $2.60

General Electric Co., Schenectady, N. Y.
DESIGN FEATURES OF THE GENERAL ELECTRIC RESEARCH LABORATORY HYPERSONIC SHOCK TUNNEL,

PROGRAMS. PROGRAMMERS AND OPERATORS MANUAL FOR SABER (SYMBOLIC ASSEMBLY ROUTINE FOR THE CDC 1604-1604A).
Technical memo.,
by F. J. LaChapelle. 8 Apr 64, 130p. SDC TM705 043 00
Contract AF19 628 1648
Unclassified report

Descriptors: (*Compilers, Programming languages), (*Programming languages, Instruction manuals), (*Programming (Computers)), Programmers, Computer operators, Satellite networks.

SABER is used by the CDC 1604 (1604-A) computer to convert symbolic-language programs into machine-language programs. Using a special-format symbolic-card deck as input, SABER assembles the program, prepares an assembly printout, a new combined input tape, and provides a binary output for use by the MTCII (Master Tape Control II) program. (Author)

AD-600 243 Div. 30, 12
OTS price $.50

System Development Corp., Santa Monica, Calif.
SCF COMPUTER PROGRAMS SYSTEM MANUAL, UTILITY PROGRAMS. TELETYPE CODE PAPER TAPE PUNCH PROGRAMS (TTTPUNCH).
Technical memo.,
by E. L. Griffith. 3 Apr 63, 10p. SDC TM705 060 00
Contract AF19 628 1648
Unclassified report

Descriptors: (*Programming (Computers), Control sequences), (*Teletype systems, Punched tape), Input-output devices, Data processing systems, Compilers, Instruction manuals, Satellite networks.

TTTPUNCH sets up a message in teletype code, then punches a 5-level paper tape in the character mode. The paper tape contains a carriage return, line feeds, and a message. (Author)

AD-600 244 Div. 30, 12
OTS price $.50

System Development Corp., Santa Monica, Calif.
SCF COMPUTER PROGRAM SYSTEMS MANUAL, UTILITY PROGRAMS. SCOPE VALIDATE MASTER TAPES (SVMT).
Technical memo.,
by E. L. Griffith. 19 Mar 64, 15p. SDC TM705 056 00
Contract AF19 628 1648
Unclassified report

Descriptors: (*Programming (Computers), Control sequences), (*Computer storage devices), Puched tape, Magnetic tape, Errors, Corrections, Instruction manuals, Satellite networks.

SCOPE Validate Master Tapes (SVMT) is designed to validate either of the SCOPE master tapes: the System Support tape (SST) or the Flight Support tape (FST). A list of the errors found is output on the typewriter, the printer, or a BCD list tape. SVMT has two modes of operation, a standard mode and an input/output parameter mode. In the standard mode, where no function parameters are used, the input master tape is on logical unit 1 and the error outputs are printed on the on-line printer. In the parameter mode the input and output units are specified by function parameters. (Author)

AD-600 245 Div. 30, 12
OTS price $.50

System Development Corp., Santa Monica, Calif.
1604A UTILITY PROGRAM DESCRIPTION, MILESTONE 11. CARD TO TAPE WITH RECOVERY (SCTT8).
Technical memo.,
by J. W. Scholz. 13 Apr 64, 20p. SDC TM1003 033 00
Contract AF19 628 1648
Unclassified report

Descriptors: (*Programming (Computers), Control sequences), (*Reading machines, Input-output devices), Punched cards, Magnetic tape, Computer storage devices, Data processing systems, Compilers, Instruction manuals, Satellite networks.

Computer program: (A) To read BCD or binary cards via the 088 card reader and write these images onto a magnetic tape via the 163, 605, or 603 tape drives; (B) to perform a sequence check on Cols. 75-80 while prestoring; and (C) to provide a Failure Recovery Procedure for BCD prestores interrupted by card jams or other hardware problems. (Author)

AD-600 271 Div. 30
OTS price $1.50

Texas Instruments, Inc., Dallas.
DEVELOPMENT OF AN INTERMEDIATE CAPACITY, HIGH-SPEED MAGNETIC FILM MEMORY SYSTEM.
Technical documentary rept., 15 July 62-15 May 63,
by H. D. Toombs and L. A. Delhom. Aug 63, 56p.
Contract AF33 657 9228, Proj. 4335, Task 433517
RTD TDR63 4216 Unclassified report

Descriptors: (*Data storage systems, Magnetic recording systems), (*Magnetic recording systems, Data storage systems), (*Data storage systems, Circuits), Magnetic fields, Computers, Aluminum, Transformers, Transistors.

The report describes the design and development of a magnetic film memory system with a storage capacity of 4096 bits arranged as 512 words of 8 bits each. The word-organized system has a read-write cycle time of 142 nanoseconds. The storage medium consists of continuous sheets of magnetic film deposited on polished aluminum substrates. The location and size of the storage bits are defined by the intersection of the word and digit-sense conductors. A transistor-current transformer matrix is used to perform word selection and to provide an 800-milliampere, 85-nanosecond base width word drive pulse. A bipolar digit pulse of ±200-milliampere, 40-nanosecond base width is used. Current switching is used in the low-level logic circuits. Pertinent memory waveforms along with operating results are given. (Author)

AD-600 276 Div. 30, 15
OTS price $1.50

Laboratory for Electroscience Research, New York Univ., N. Y.
A STUDY OF THE CHAIN-DIFFERENCE CORRELATION TECHNIQUE FOR CONTOUR LINE PATTERNS.
Technical note,
by E. B. Socci. Mar 64, 59p. NYU TN400 22
Grant AF AFOSR24 63
AFOSR 64 0941 Unclassified report

Descriptors: (*Correlation techniques, Pattern recognition), (*Pattern recognition, Digital computers), (*Information retrieval, Graphics), Curve fitting, Geometric forms, Processing, Programming (Computers).

A correlation technique for contour-line patterns which is invariant to rotation is described. The technique is based on the so-called chain-encoding method for contour-line data, in which a

the resultant program, the second minimizes computer running time. During the conversion process, both pinpoint any contradictions or redundancies among the rules in a table. A necessary adjunct to minimizing computer storage or running time is the allowable reduction of the number of rules in a decision table. This Memorandum describes a technique to effect this reduction for paris, triplets and quadruplets of rules. The system analyst will find this method most helpful for pairs, and generally unprofitable for n-tuplets greater than three. The technique can be done manually or accomplished by the computer as a prelude to executing one of the two algorithms. (Author)

AD-600 564 Div. 30, 9
OTS price $.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
EFFECTIVENESS OF A GRID IN A BLAST SIMULATOR.
Technical note,
by V. H. Crow. 1964, 18p.
Tasks Y F008 08 02 108, DASA13 018
NCEL N561 Unclassified report

Descriptors: (*Simulators, Nuclear explosions), Mechanical waves, Explosion effects, Structural parts, Loading (Mechanics), Effectiveness, Tests.

Test results are presented which demonstrate the effectiveness of a layered grid in increasing the duration of the loading in the NCEL blast simulator. The tests were performed to check the hypothesis that long-duration loads could be obtained in a semi-closed load generation system without developing objectionable reflected pressures. This information was needed to check out a principle of operation for a proposed traveling wave blast simulator. The data demonstrate that it is possible to materially increase the duration for a given energy expenditure and simultaneously prevent the formation of large reflected pressure waves. (Author)

AD-600 587 Div. 30, 8
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
METHODS OF CONVERTING VOLTAGES INTO BINARY CODES,
by M. G. Reinberg. 14 Apr 64, 20p.
FTD TT63 1143; TT 64 11693 Unclassified report

Unedited rough draft trans. of Tsifrovaya Tekhnika i Vychislitel'nye Ustroistva (USSR) 1962, no. 2, p. 153-163.

Descriptors: (*Voltage, Coding), (*Coding, Sequences), Pulse integrators, Time interval counters, Pulse generators, USSR.

This paper describes some new methods of coding in which the principles of time conversion and sequential binary weighing are combined. The application of a piecewise-linear voltage formed by a d-c integrator with logical time control forms the basis of several methods of coding electrical potentials. One of these methods is based on sequential binary quantization of time intervals and conversion from a time to an amplitude parameter. In a compound convertor one portion of which forms the top digits of the code by the proposed method and the second the lowest digits by the usual method of time conversion, achieves a manifold increase in coding time with an insignificant increase in equipment. The basic instrument error of the compound convertor results from the characteristics of the coding method, does not exceed the corresponding error in time convertors. Application of the principle of logical control by a d-c integrator in the time scale makes it possible to obtain linearly broken voltages of most diverse form which may be used in complex scanning devices, in literal indication schemes, cathode ray tubes, and in a number of other cases. (Author)

AD-600 616 Div. 30
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ONE METHOD OF INFORMATION EXTRACTION FROM COMPUTER MACHINES,
by V. K. Eliseev. 28 Apr 64, 10p.
FTD TT64 236; TT 64 11706 Unclassified report

Unedited rough draft trans. of Avtomatizatsiya i Priborostroenie (USSR) 1963, no. 3, pp. 29-32.

Descriptors: (*Information retrieval, Graphics), (*Programming computers, Control sequences), Digital computers, Compilers, Binary arithmetic, Cathode ray tube screens, Display systems, USSR.

The following method is used to obtain symbol representations. The symbol image which must be coded is written in a special standard frame which is broken down into squares (m squares along the horizontal and n along the vertical). If the white squares by zero and the black squares are designated by one, the symbol may be written in the form of a binary code having a length of m x n digits. For definiteness it is agreed to write rows from left to right and columns bottom to top. The following frame dimensions are used in the program: five elements per row and seven elements per column. Thus each symbol may be coded in the form of a 40-digit binary code which is placed in one cell of the 'Kiev' memory. To display the symbol an operation similar to that of coding but in reverse order is carried out. (Author)

AD-600 675 Div. 30, 12
OTS price $1.00

Naval Ordnance Test Station, China Lake, Calif.
THE DESIGN OF A TEMPERATURE-COMPENSATED-THERMOCOUPLE REFERENCE CIRCUIT.
Rept. for Apr 62-Feb 63,
by James King. May 64, 32p.
NOTS TP3462; NAVWEPS 8492 Unclassified report

Descriptors: (*Thermocouple pyrometers, Design), Thermocouples, Circuits, Design, Environmental tests, Guided missiles.

This report describes some basic properties of thermocouples and the design of a temperature-compensated-thermocouple reference circuit that is to be used as a device for measuring temperatures during missile flight tests. This circuit, and its application, was developed for use in Sidewinder 1C environmental temperature studies. (Author)

AD-600 678 Div. 30
OTS price $1.00

Informatics, Inc., Culver City, Calif.
PRELIMINARY DIAGNOSTIC PROGRAMS FOR RW 400

by H. T. Nagamatsu, R. E. Sheer, Jr., L. A. Osburg and K. H. Cary. May 61, 30p. R61RL (2711C)
Contract AF04 647 269
Unclassified report

Descriptors: (*Hypersonic wind tunnels, Design), (*Shock tubes, Design), Instrumentation, Test facilities, Operation, Conical nozzles, Combustion, Gases, Stainless steel.

Design features of the General Electric Research Laboratory hypersonic shock tunnel are described. Particular emphasis is placed on many of its unique features. The loading and ignition system for consistent driver combustion without detonation is discussed. The anchoring of the driver and the slip joint clamping section that holds the main scored diaphragm is described in some detail. By boring and honing the stainless steel tubes, the attenuation of the shock wave in the long driven section was minimized. The use of a second diaphragm and a slip joint at the entrance to a conical nozzle is explained. The development of instrumentation necessary for shock tunnel operation is shown to have progressed to a point where the hypersonic shock tunnel is an extremely useful and versatile tool for hypersonic research. It is possible to simulate the Mach numbers and temperatures encountered by ICBM's, satellites, and space vehicles at the high altitude conditions. (Author)

AD-600 346 Div. 30, 9
OTS price $2.60

Colorado State Univ., Fort Collins.
A RESISTANCE THERMOMETER FOR TRANSIENT TEMPERATURE MEASUREMENTS.
Fluid mechanics paper,
by J. L. Chao and V. A. Sandborn. Jan 64, 29p.
CSU FMP1
Grant DA SIG36 039 62G24
Unclassified report

Descriptors: (*Resistance thermometers, Sensitivity), (*Gas flow, Temperature), Temperature, Sensitivity, Wire, Platinum alloys, Rhodium alloys, Transients, Resistance, Heat transfer coefficients, Heat transfer, Thermal conductivity, Specific heat, Mathematical prediction.

A 0.000025 inch diameter, 90% platinum-10% rhodium wire was evaluated as a resistance thermometer. From steady state evaluation of the wire's physical properties, the transient response of the wire was predicted. The predictions agree well with measured time constants for the wire. The bare wire with a detection current of 0.1 milliamps will have a sensitivity of approximately .07 millivolts per degree F. The frequency response of the wire in still air is 3200 cycles per second and this increased to approximately 6000 cycles in a moving air stream of 100 feet per second. (Author)

AD-600 379 Div. 30
OTS price $1.50

General Electric Co., Syracuse, N. Y.
FEASIBILITY STUDY OF: STOCHASTIC MATRIX STORAGE AND PROCESSING USING THERMOPLASTIC AND OIL FILM TECHNIQUES.
Final technical documentary rept.,
by J. W. Brouillette and M. L. Noble. Feb 64, 51p.
Contract AF19 628 2974, Proj. 4648, Task 464806
AFCRL 64 294 Unclassified report

Descriptors: (*Matrix algebra, Data processing systems), (*Optical equipment, Analog systems), Data storage systems, Thermoplastics, Films, Oils, Stochastic processes, Transformations (Mathematics), Photographic techniques, Feasibility study.

This Report describes an optical processing system which can perform matrix transformations of vectors of large dimensionality at exceedingly wide processing bandwidths by parallel analog techniques. Input vectors of wide bandwidth, up to 10 megacycles, are recorded as surface deformations on a thermoplastic film. A unique optical processing system utilizing a photographic plate bearing the matrix automatically performs the required matrix transformation. The output vector is displayed on a cathode-ray tube and additionally recorded on the thermoplastic film. This approach will potentially permit matrix transformations of vectors with 1,000 resolvable elements at rates from 1 to 10 per second and perhaps higher. (Author)

AD-600 390 Div. 30, 15, 25
OTS price $.75

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
BENDING OF RECTANGULAR PLATES WITH FINITE DEFLECTIONS,
by Frances Bauer, Louis Bauer, William Becker and Edward L. Reiss. Apr 64, 27p. IMM NYU322
Contracts Nonr285 42, AT30 1 1480
Unclassified report

Descriptors: (*Rectangular bodies, Deformation), Loading (Mechanics), Deflection, Stresses, Boundary value problems, Mathematical analysis.

A previously developed iterative procedure is applied to obtain numerical solutions of the von Karman equations for rectangular plates subjected to a uniform normal pressure. On the simple supported boundary it is assumed that the normal membrane stress and the tangential membrane displacement vanish. Solutions are obtained for a wide range of values of the loading parameter and the aspect ratio. Boundary layers develop both as the loading parameter and the aspect ratio increase. The stresses and deflections are examined and compared with an 'asymptotic' solution which can be valid only in the interiors of long plates. A comparison is made with a previously obtained approximate solution by the Ritz method for the square plate. (Author)

AD-600 412 Div. 30
OTS price $.50

RAND Corp., Santa Monica, Calif.
CONVERSION OF LIMITED-ENTRY DECISION TABLES TO COMPUTER PROGRAMS,
by Solomon L. Pollack. May 64, 20p. RM4020PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Decision theory, Tables), (*Programming (Computers), Decision theory), Compilers, Operations research, Systems engineering, Graphics.

Decision tables are useful for describing a set of complex decision rules based on given sets of conditions. Algorithms that can efficiently covert the tables into computer programs will extend the usefulness of decision tables to computer users. This Memorandum describes two such algorithms, based on work done by M. S. Montalbano and extended here to handle dashes and ELSE-decision rules. The first algorithm minimizes the computer storage space required for

AD-600 867 Div. 30, 11
OTS price $3.50

IIT Research Inst., Chicago, Ill.
DESIGN CRITERIA FOR GROUND-INDUCED DYNAMIC LOADS.
Rept. for Mar 62-Oct 63,
by Edward E. Hahn. Nov 63, 207p.
Contract AF33 657 8231, Proj. 1367, Task 136701
RTD TDR63 4139V2 Unclassified report

Descriptors: (*Vehicles, Loading (Mechanics)), (*Loading (Mechanics), Vehicles), Design, Data, Surfaces, Equations, Motion, Programming (Computers), Vibration, Statistical analysis, Dynamics.

The purpose of this research program was to collect all available measured prepared surface profile and power spectral data, to ascertain the reliability of these data, to establish from these data design criteria for vehicles operating on prepared surfaces, and to demonstrate the applicability of these design criteria. Both deterministic and statistical analyses are used to determine the responses of a five-degree-of-freedom vehicle to some of the criteria developed in Volume I of this report. Volume I is concerned with the collection of profile and power spectra data for runways, taxiways and ramps, ascertaining the reliability of these data, and establishment from the data sets of design criteria for vehicles operating on prepared surfaces. (Author)

31. SHIPS AND MARINE EQUIPMENT

AD-600 187 Div. 31, 2
OTS price $.50

Navy Electronics Lab., San Diego, Calif.
DEPTH REGULATION OF LOWERED OCEANOGRAPHIC EQUIPMENT.
Development rept., Sep 61-May 63,
by C. J. Shipek and E. C. Evans. 27 Mar 64, 14p.
Proj. SR004 03 01, Task 0539
NEL 1215 Unclassified report

Descriptors: (*Oceanographic equipment, Depth indicators), (*Hoists, Control systems), Stabilization systems, Design, Operation.

Experimental depth regulation equipment has been developed for the vertical stabilization of oceanographic instruments lowered by wire from free-floating platforms. Surface wave action imparts to such instruments a vertical motion that is sensed with a submerged bellows detector. A synchro motor attached to the bellows develops an error signal which is amplified, reversed in phase, and fed into a power control unit on a winch. The latter automatically pays out and takes in wire as demanded by the pressure sensor. The equipment can be utilized to hold deep sea cameras at specific heights above the sea floor or to hold other devices such as transducers, water bottles, and current meters at constant depths. Dockside tests with the experimental sensor and winch control equipment have been successful. (Author)

AD-600 335 Div. 31, 30
OTS price $3.60

David Taylor Model Basin, Washington, D. C.
DYNAMIC DESIGN-ANALYSIS PROGRAM FOR THE SHOCK DESIGN OF SHIPBOARD EQUIPMENT.
Preliminary rept.,
by Joseph E. Sullivan and David F. Templeton. Mar 64, 40p.
Proj. S R003 03 01
DTMB 1765 Unclassified report

Descriptors: (*Programming (Computers), Design), (*Programming languages, Data processing systems), Punched cards, Shock (Mechanics), Analysis, Ships, Shipyards.

The mathematical analysis of a lumped parameter system and the solution for the natural frequencies and normal modes of the system are discussed. Formulas for obtaining effective static forces, maximum displacements and reactions, and effective masses are also presented. Instructions for obtaining computation services at the Applied Mathematics Laboratory, David Taylor Model Basin, and specifications for needed data are included as well as suggestions on the use of the program at other installations. (Author)

AD-600 336 Div. 31, 30
OTS price $1.00

David Taylor Model Basin, Washington, D. C.
AN EXPERIMENTAL INVESTIGATION OF CLOSURES AND PENETRATIONS FOR PRESSURE VESSELS OF COMPOSITE CONSTRUCTION.
by Thomas J. Kiernan and Martin A. Krenzke. Feb 64, 38p.
Proj. S F013 01 03
DTMB 1732 Unclassified report

Descriptors: (*Pressure vessels, Composite materials), (*Pressure vessels, Penetration), Steel, Reinforcing materials, Cylindrical bodies, Hemispherical shells, Strain (Mechanics), Fatigue (Mechanics), Oceanographic vessels, High-pressure research, Submarine hulls.

An experimental investigation was made of closures and penetrations for pressure vessels of composite construction designed for deep depths. A method is presented for designing reinforcement for penetrations through hemispherical closures to provide membrane boundaries. Test results indicate that no serious difficulty is involved in closing as well as penetrating cylindrical hulls of composite construction. (Author)

AD-600 361 Div. 31
OTS price $3.00

David Taylor Model Basin, Washington, D. C.
EXPERIMENTAL PERFORMANCE OF TMB SUPERCAVITATING PROPELLERS,
by Richard Hecker, J. G. Peck, and N. A. McDonald. Jan 64, 163p.
Projs. S F013 01 01, SR009 01 01
DTMB 1432 Unclassified report

Descriptors: (*Propellers (Marine), Cavitation), (*Cavitation, Propellers (Marine)), Performance (Engineering), Design, Water tunnels.

In order to evaluate the TMB design method for supercavitating (SC) propellers, and the validity of the theoretically calculated supercavitating design charts, several supercavitating propellers were built and tested in the TMB 24-inch water tunnel. The test results are given. Comparisons between the predicted performance and the test results showed that the predictions are adequate enough to warrant the use of the TMB supercavitating series charts. Parts of the theory used in the design method are inadequate, however, and improvements in the theory can be expected to lead to more accurate predictions.

Division 30 - RESEARCH AND RESEARCH EQUIPMENT

COMPUTER SYSTEM.
Final rept.
May 64, 33p.
Contract AF30 602 3106, Proj. 040A
RADC TDR63 547 Unclassified report

Descriptors: (*Digital computers, Programming (Computers)), (*Programming (Computers), Digital computers), Computers, Malfunctions, Test methods, Reliability, Compilers.

This document explains the purpose and operation of diagnostic programs written for modules of the RW 400 computer. It is an explanation and guide to the use of those programs. The diagnostic programs themselves will be used to test the RW 400 modules periodically to determine whether or not they are functioning properly. They are primarily to aid in maintenance. The programs are contained on punched computer cards located at the Rome Air Development Center's Experimental Facility. (Author)

AD-600 742 Div. 30, 16
OTS price $8.10

ITT Federal Labs., Nutley, N. J.
RESEARCH AND INVESTIGATION ON THE TRANSMISSION LINE ANALOG OF SOME FUNCTIONS OF THE COCHLEA,
by L. M. Vallese. May 64, 85p.
Contract AF33 657 8873, Proj. 4160, Task 416001
AL TDR64 108 Unclassified report

Descriptors: (*Cybernetics, Sound), (*Analog systems, Ear), (*Bionics, Ear), Models (Simulations), Learning, Design, Automata, Sound generators, Pulse modulation, Audio amplifiers, Transmission lines, Physiology, Electronic countermeasures, Communication systems.

The feasibility of design of a Tune Learning Machine, capable of demonstrating learning of given time sequences of tones by an automaton, is investigated. A complete unit possessing sources of internally generated tones, sensors of external tunes, controls of the internally generated tones, memory, etc is described. A Fourier Analyzer consisting of an advanced version of a previously designed 'Cochlea Analog Model' is also presented. (Author)

AD-600 776 Div. 30, 7
OTS price $6.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ELECTRICAL RESISTANCE MEASURING DEVICES,
by Z. Ruzga. 20 Mar 64, 416p.
FTD TT63 730; TT 64 11736
Unclassified report

Unedited rough draft trans. of mono. Elektricheskie Tenzometry Soprotivleniya, Moscow/Leningrad, 1961, 336p.

Descriptors: (*Resistance (Electrical), Strain gages), (*Strain gages, Resistance (Electrical)), Design, Performance (Engineering), Strain (Mechanics), Stresses, Temperature, Humidity.

Contents: General Remarks on Strain Gages; Wire Resistance Strain Gages; The Measurement of Small Changes in Strain Gage Resistance and Their Connections; The Effects of Environmental Conditions on Strain Gage Measurements; Strain Gage Instrumentation; The Measurement of Stress; and Other Applications of Wire Strain Gages.

AD-600 779 Div. 30, 9
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
RECORDER OF PRESSURE PULSATIONS AND THEIR FREQUENCIES IN LIQUID AND GAS FLOWS,
by S. Samoilovich and I. Neruda. 27 Apr 64, 4p.
FTD TT64 181, TT 64 11738
Unclassified report

Unedited rough draft trans. of Russian patent 154070, appl. no. 782255/26/20, pp. 1-2, 11 June 62.

Descriptors: (*Pressure gages, Design), (*Manometers, Instrumentation), (*Fluid dynamic properties), Pressure, Recording systems, Gas flow, Fluid flow.

The recorder of pressure pulsations and their frequencies in liquid and gas flows, equipped with connecting tubes and two measuring lines linked through a differential manometer, is different in that to measure the time-averaged value of pulsations or their frequencies and to simplify the design, a hydrodynamic element was placed in every measuring line in the form of a parabolic horn, having a different discharge rate depending on the direction of liquid overflow, and both elements are oriented differently to the flow. (Author)

AD-600 810 Div. 30
OTS price $.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
MAGMA-DEVELOPMENT OF ENERGY: SCIENCE ON THE THRESHOLD OF FANTASY,
by N. N. Semenov. 2 Apr 64, 6p.
FTD TT63 1088; TT 64 11663
Unclassified report

Trans. of Savremena Tehnika (Czechoslovakia) (sic) 1963, no. 15, 19 Aug, p. 288-289.

Descriptors: (*Power supplies, Energy conversion), (*Energy conversion, Power supplies), Czechoslovakia.

A popularized discussion of possible future energy sources (thermonuclear, solar, magma, etc.).

AD-600 838 Div. 30, 8, 12
OTS price $.75

Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA SYSTEMS
Quarterly progress rept., Division 2, 1 Feb-30 Apr 64,
by F. C. Frick and S. H. Dodd. 15 May 64, 21p.
Contract AF19 628 500
ESD TDR64 57 Unclassified report

Descriptors: (*Data processing systems, Digital computers), (*Digital computers, Design), (*Systems engineering, Data processing systems), Computer logic, Computer storage devices, Electronic equipment, Compilers, Programming (Computers), Bionics, Information retrieval, Ballistics.

Contents: Digital Computers--Computer Systems; Circuit Development; Magnetic Film Engineering; Electron Transport; Magnetic Films; Advanced Circuits; Automatic Procedure Executor; Control Research--Data File, Storage, Retrieval and Editing.

A summary is given of a few of the more important things that economists know about the way science and technology affect the performance of the economic system, suggestions on what might be the proper objectives for public policy, and the identification of a few of the major problems that policy must overcome. The analysis and interpretation is of the American economy. (Author)

AD-600 394 Div. 32
OTS price $1.00

Ammunition Engineering Directorate, Picatinny Arsenal, Dover, N. J.
VALUE ENGINEERING AND THE IMPORTANCE OF ENGINEERING DOCUMENTATION.
Technical memo.,
by Jules Groudan. Apr 64, 33p.
PA TM1391 Unclassified report

Descriptors: (*Engineering, Manufacturing methods), (*Documentation, Economics), Design, Metals, Structural parts, Materials, Processing, Industrial research, Production, Costs, Reduction, Decision making.

Value Engineering is often defined as a new name for the old game of Cost Reduction a rearrangement of familiar design concepts, but worst of all a synonym for production and industrial engineering. The improvement areas considered by the Value Engineer and generally applicable in its broader sense to industry as obvious areas of excessive cost are: (1) Design simplification of metal parts; (2) Materials; (3) Processes and manufacturing methods; and (4) Documentation cost. (Author)

AD-600 453 Div. 32, 2
OTS price $2.60

Missouri Univ., Columbia.
THE ENERGY BUDGET OF VEGETATIVE COVER.
Final rept.,
by Wayne L. Decker. 1 May 64, 24p.
Contract Cwb10256
Unclassified report

Descriptors: (*Soils, Evapotranspiration), (*Plants, (Botony), Heat transfer), Moisture, Rainfall, Water, Vegetables, Radiometers, Energy, Budgets, Equations, Sun, Solar radiation, Surfaces, Climatology, Missouri, Meteorology.

AD-600 728 Div. 32
OTS price $.50

Aerospace Corp., Los Angeles, Calif.
PROFESSIONAL PAPERS CLEARED FOR POSSIBLE PUBLICATION AND/OR PRESENTATION.
Rept. for 16 Apr-15 May 64,
by Frances A. Brady. 31 May 64, 6p. CSR269 9990PP11
Contract AF04 695 269
Unclassified report

Descriptors: (*Reports, Bibliographies), (*Bibliographies, Scientific research), Physics, Fluid mechanics, Materials.

AD-600 751 Div. 32
OTS price $2.25

Bureau of Applied Social Research, Columbus Univ., New York.
THE AMERICAN PUBLIC AND THE FALLOUT-SHELTER ISSUE (A NINE-COMMUNITY SURVEY). VOL. II. THE STUDY DESIGN AND THE STUDY COMMUNITIES,
by Gene N. Levine and John Modell. Oct 63, 91p.
Contract OCD OS62 71
Unclassified report

Descriptors: (*Public opinion, Shelters), (*Civil defense systems, Public opinion), (*Shelters, Public opinion), United States, Sociometrics, Radioactive fallout, Psychometrics, Selection.

The report contains the details of the study design and descriptions of the nine communities in which interviews were collected. Attention is given to the ways in which the study communities were selected and the basic questionnaire devised. (See also AD-600 752) (Author)

AD-600 752 Div. 32
OTS price $1.00

Bureau of Applied Social Research, Columbia Univ., New York.
THE AMERICAN PUBLIC AND THE FALLOUT-SHELTER ISSUE (A NINE-COMMUNITY SURVEY). VOL. I. A SUMMARY OF METHODS, FINDINGS, AND IMPLICATIONS,
by Gene N. Levine and John Modell. May 64, 34p.
Contract OCD OS62 71
Unclassified report

Descriptors: (*Public opinion, Shelters), (*Civil defense systems, Public opinion), (*Shelters, Public opinion), United States, Sociometrics, Radioactive fallout, Emotions, Fear, Psychometrics.

A public opinion survey was made on the public's reactions to the Cold War, and especially to throw light on their opinions and actions on the fallout-shelter issue. (Author)

AD-600 857 Div. 32
OTS price $.50

Forest Products Lab., Madison, Wis.
PATTERN OF VARIATION OF FIBRIL ANGLE WITHIN ANNUAL RINGS OF PINUS ATTENURADIATA.
Research note,
by Charlotte H. Hiller. Apr 64, 13p.
FPL 034 Unclassified report

Descriptors: (*Rings, Wood), (*Trees, Rings), Forestry, Fibers (Natural), Analysis of variance.

The variation of fibril angle within and between rings was investigated in 10-year-old trees of two Pinus attenuradiata Stockwell and Righter clones. Within an annual ring, the fibril angles decreased from the beginning of the earlywood to the end of the latewood, following a linear trend. The fibril angles of the beginning of the earlywood tended to be larger than the angles in the latewood of the preceding annual ring. The trend within the ring did not appear to be modified by the amount of latewood in the annual ring or by the width of the ring. Between the first six to eight annual rings from the pith, no signficant radial trend was observed in the variation of the average fibril angles of the latewood or of the entire annual ring with the exception of one case where the trend was negative and parabolic. The fibril angles in compression wood followed the same general trends of variation within and between rings. (Author)

33. TRANSPORTATION

No Entries

Calculations were performed using nonlinear lift coefficients and cavitating corrections, but only a small improvement was obtained. Finally, it is concluded that a rational lifting surface theory is needed. (Author)

AD-600 690 Div. 31, 30
OTS price $.50

David Taylor Model Basin, Washington, D. C.
MODEL TESTS OF A TUNNEL-BOTTOM 36-FOOT RIVER PATROL CRAFT,
by Charles W. Tate. May 64, 17p.
Task S F014 02 02
DTMB 1846 Unclassified report

Descriptors: (*Model tests, Hulls (Marine)), (*Patrol craft, Model tests), Hulls (Marine), Hydrodynamic configurations, Fluid dynamic properties.

Model tests of a new and somewhat unconventional boat, the 36-foot River Patrol Craft, were made by the Model Basin. The bottom of this craft has a single deep tunnel forward which gradually decreases convexly in depth to a flat bottom at 60 percent of the hull length. There it bisects into two shallow tunnels, which are symmetrical about their centerlines. The afterbody tunnels increase in depth to the transom. During the tests it was discovered that the single tunnel forward collected an appreciable quantity of air which then migrated aft past the propeller positions in the tunnels of the afterbody and from there astern into the wake. Test results for two design displacements, above water and underwater photographs at these displacements, and a discussion of the flow of air under the hull are presented. (Author)

AD-600 840 Div. 31, 9
OTS price $1.00

Michigan Univ., Ann Arbor. Coll. of Engineering.
A NOTE ON WAVE-MAKING RESISTANCE OF CATAMARANS.
Technical rept.,
by Ryo Tasaki and R. B. Couch. Oct 62, 34p.
ORA 04886 2T
Contract NObs4485, Proj. 04886
Unclassified report

Descriptors: (*Oceanographic vessels, Ship hulls), (*Ship hulls, Fluid dynamic properties), (*Water waves, Ocean waves).

The wave-making resistance of the catamaran can be divided into two parts, one the resistance of each hull and the other the resistance increase due to the interference between two hulls. The resistance increase due to the interference can be further divided into two parts. The first part, the monotonic and positive term, is a monotonically decreasing function with respect to the increase of the product of speed parameter K sub o and distance parameter between the two hulls, K sub ok. For a catamaran with small distance between the two hulls, the wave-resistance increase due to this term is dominant over the second part. The second part, the oscillating term, which oscillates with respect to the speed parameter K sub o, does not change rapidly with respect to the distance between the two hulls. The ratio of the resistance increase due to the interference to the resistance of each hull is not appreciably affected by the changes in draft. (Author)

32. MISCELLANEOUS ARTS AND SCIENCES

AD-600 219 Div. 32
OTS price $2.60

Pennsylvania Univ., Philadelphia.
THE DISCONTINUOUS VERB IN ENGLISH.
Technical note,
by Anna H. Live. Oct 63, 23p.
Grant AF AFOSR477 64
AFOSR 64 0950 Unclassified report

Descriptors: (*Language, Analysis), Speech, Classification.

A discussion is given of discontinuous verbs from the point of view of a few consistent syntactic patterns, involving transitivity, passive transformation, word order, and relative stress.

AD-600 220 Div. 32
OTS price $3.60

Pennsylvania Univ., Philadelphia.
ON ENGLISH PRONOUNS AND THEIR VERBAL AGREEMENT.
Technical note,
by A. F. Brown. Sep 63, 32p.
Grant AF AFOSR477 64
AFOSR 64 0948 Unclassified report

Descriptors: (*Language, Analysis), Speech.

An attempt is made to cover all the crucial environments and to set up a minimal but sufficient number of morphemic components to account for the occurrence of pronominal forms in these environments, or, conversely, to account for the effect of these pronominal forms upon their environments. (Author)

AD-600 221 Div. 32, 8, 30
OTS price $16.50

Jonker Business Machines, Inc., Gaithersburg, Md.
A MODEL INFORMATION RETRIEVAL NETWORK FOR GOVERNMENT, SCIENCE AND INDUSTRY. A PROPOSED BASIC CONFIGURATION FOR A NATIONAL SYSTEM OF INTERLINKING INFORMATION RETRIEVAL NETWORKS.
May 64, 259p.
Contract AF49 638 1209
AFOSR 64 0942 Unclassified report

Descriptors: (*Information retrieval, Networks), (*Data transmission systems, Information retrieval), Documentation, Subject indexing, Models (Simulations), Theory, Economics.

The report describes the technical, organizational and financial aspects of a model Information Retrieval Network which could be made operational at the present time. (Author)

AD-600 274 Div. 32
OTS price $.75

RAND Corp., Santa Monica, Calif.
SCIENCE, THE ECONOMY, AND PUBLIC POLICY,
by Richard R. Nelon. Apr 64, 22p. P2903
Unclassified report

Descriptors: (*Economics, Scientific research), (*Commerce, Production), Political science.

SUBJECT INDEX

ABLATION
DECELERATION
DECELERATION AND MASS CHANGE OF AN ABLATING BODY DURING HIGH-VELOCITY MOTION,
AD-600 692 DIV. 9

ABLATION
POLYMERS
HEAT AND MASS TRANSFER DURING ABLATION OF POLYMERIC MATERIALS,
AD-600 631 DIV. 14

ABLATION
REENTRY VEHICLES
ABLATION OF A SOLID SPHERE OF LOW THERMAL CONDUCTIVITY MATERIAL,
AD-600 173 DIV. 25

ABSORPTION SPECTRUM
ANALYSIS
ANALYSIS OF THE ABSORPTION SPECTRUM OF THE NITRIC OXIDE MOLECULE,
AD-600 389 DIV. 25

ABSORPTION (BIOLOGICAL)
BRONCHI
PROCEDURE OF WASHING A LOBE OF THE LUNG WITH AQUEOUS SOLUTIONS OF CHEMICALS AND BIOLOGICAL PRODUCTS,
AD-600 424 DIV. 14

ABSORPTION (BIOLOGICAL)
INTESTINES
ABSORPTION OF LONG-CHAIN FATTY ACIDS BY INTESTINAL PERFUSION
AD-600 832 DIV. 14

ABSORPTION (BIOLOGICAL)
LIPIDS
EFFECT OF LIPASE INGESTION ON BLOOD LIPID LEVELS,
AD-600 833 DIV. 14

ABSTRACTING
USSR
PHENOMENA IN THE UPPER ATMOSPHERE: COMPILATION OF ABSTRACTS FROM SOVIET-BLOC LITERATURE,
AD-600 050 DIV. 2
PHENOMENA IN THE UPPER ATMOSPHERE: COMPILATION OF ABSTRACTS,
AD-600 051 DIV. 2

ABSTRACTS
LIFE SUPPORT
SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS, PT. A, BIOSCIENCES: COMPILATION OF ABSTRACTS,
AD-600 149 DIV. 14

ACETONES
CONDENSATION REACTIONS
STUDIES ON ISONITROSOKETONES,
AD-600 180 DIV. 4

ACHIEVEMENT TESTS
PSYCHOMETRICS
DIFFICULTY OF ITEMS ON AN ACHIEVEMENT TEST OF REPORT WRITING AND OTHER CORRELATES OF CRITICALNESS RESPONSE STYLE AT THE ITEM LEVEL,
AD-600 702 DIV. 28

ACOUSTIC PROPERTIES
SPEECH
ACOUSTIC SPECIFICATION OF SPEECH: SPEECH TRANSMISSION LABORATORY, STOCKHOLM, SWEDEN, ANNUAL REPORT,
AD-600 865 DIV. 8

ACOUSTICS
FATIGUE (MECHANICS)
TITAN 3 STRUCTURAL SKIN PANELS ACOUSTIC AND RANDOM VIBRATION-FATIGUE REPORT,
AD-600 418 DIV. 12

ACRYLIC RESINS
ELASTICITY
RUBBER ELASTICITY OF PRESWOLLEN POLYMER NETWORKS HAVING HIGHLY CROSSLINKED VINYL-DIVINYL SYSTEMS,
AD-600 432 DIV. 14

ACRYLIC RESINS
SYNTHESIS (CHEMISTRY)
SYNTHESIS AND EVALUATION OF POLYMERS WITH SPECIAL PROPERTIES,
AD-600 063 DIV. 4

ACRYLIC RESINS
THERMAL RADIATION
THERMAL RADIATION RESISTANCE OF STRETCHED ACRYLIC PLASTICS USED FOR AIRCRAFT CANOPIES,
AD-600 730 DIV. 14

ACRYLONITRILE POLYMERS
PLASTIC COATINGS
THE FIELD EVALUATION OF AN EXPERIMENTAL AIR DRY FUEL RESISTANT COATING,
AD-600 030 DIV. 14

ADAPTIVE CONTROL SYSTEMS
FEASIBILITY STUDIES
INVESTIGATION OF A SELF-ADJUSTING SYSTEM WHICH CONTROLS THE INTERMEDIATE QUALITY CRITERION,
AD-600 482 DIV. 1

ADAPTIVE CONTROL SYSTEMS
PITCH (MOTION)
ANALYSIS OF TWO NONLINEAR FLIGHT CONTROL SYSTEMS, PART I, LIAPOUNOV-LURJE APPROACH TO A SIMPLIFIED PITCH RATE AUTOPILOT, PART II, ANALYSIS OF A HIGH-GAIN ADAPTIVE PITCH RATE AUTOPILOT,
AD-600 771 DIV. 1

ADHESIVES
AGING MATERIALS
AGING OF RACEWAY ADHESIVE,
AD-600 679 DIV. 14

ADHESIVES
STRENGTH
EFFECT OF SURFACE PREPARATION AND ELEVATED TEMPERATURE STORAGE ON ADHESIVE BONDS TO ALUMINUM,
AD-600 033 DIV. 14

ADHESIVES
STRESSES
SONIC FATIGUE DAMPING MATERIAL,
AD-600 170 DIV. 1

ADIABATIC GAS FLOW
BOUNDARY LAYER
SUPERSONIC SEPARATED AND REATTACHING LAMINAR FLOWS: I. GENERAL THEORY AND APPLICATION TO ADIABATIC BOUNDARY LAYER-SHOCK WAVE INTERACTIONS,
AD-600 097 DIV. 9

ADMITTANCE
LOOP ANTENNAS
ADMITTANCE OF BARE CIRCULAR LOOP ANTENNAS IN A DISSIPATIVE MEDIUM,
AD-600 539 DIV. 8

AERIAL CAMERAS
OPTICAL EQUIPMENT COMPONENTS
OPTICAL DEVICE WHICH COMPENSATES FOR LINEAR SHIFT IN PANORAMIC STRIP AERIAL PHOTOGRAPHY WITH HORIZONTAL SCANNING,
AD-600 122 DIV. 24

AERIAL PICKUP SYSTEMS
FLIGHT TESTING
AIR-TO-GROUND PICKUP SYSTEM FOR CARIBOU AIRCRAFT,
AD-600 500 DIV. 1

AERODYNAMIC CHARACTERISTICS
BIBLIOGRAPHIES
AEROSONICS BIBLIOGRAPHY,
AD-600 455 DIV. 9

AERODYNAMIC CHARACTERISTICS
BLUNT BODIES
TURBULENT DIFFUSION IN THE WAKE OF A BLUNTNOSED BODY AT HYPERSONIC SPEEDS,
AD-600 632 DIV. 9

AERODYNAMIC HEATING
ANGLE OF ATTACK
EFFECT OF ANGLE ATTACK ON LAMINAR CONNECTIVE HEAT TRANSFER ON SHARP AND BLUNT CONES,
AD-600 628 DIV. 9

AERODYNAMIC HEATING
BLUNT BODIES
INVISCID, NONADIABATIC FLOW ABOUT BLUNT BODIES UNDER CERTAIN RE-ENTRY CONDITIONS,
AD-600 592 DIV. 9

AERODYNAMIC HEATING
COOLING
DEVELOPMENT AND TEST OF A LABORATORY SYSTEM FOR SIMULATION OF AERODYNAMIC AND RADIATIVE COOLING OF STRUCTURES,
AD-600 155 DIV. 9
ABLATION OF A SOLID SPHERE OF LOW THERMAL CONDUCTIVITY MATERIAL,
AD-600 173 DIV. 25

AERODYNAMIC HEATING
WINGS
APPROXIMATE ENGINEERING METHOD FOR DETERMINATION OF AERODYNAMIC HEATING OF HYPERSONIC GLIDER WINGS,
AD-600 625 DIV. 1

AERODYNAMIC LOADING
TRANSPORT PLANES
STRUCTURAL FLIGHT LOADS DATA FROM C-130 AIRCRAFT,
AD-600 470 DIV. 1

AEROSOLS
PROCEDURE OF WASHING A LOBE OF THE LUNG WITH AQUEOUS SOLUTIONS OF CHEMICALS AND BIOLOGICAL PRODUCTS,
AD-600 424 DIV. 14

AGING (MATERIALS)
BRASS
AGING OF BRASS BY DISSOLUTION OF THE EXCESS PHASES,
AD-600 814 DIV. 17

AGING (MATERIALS)
ROCKET CASES
AGING OF RACEWAY ADHESIVE,
AD-600 679 DIV. 14

AIR
INJECTION
DISCUSSION OF NESS'S ANALYSIS FOR A TURBULENT BOUNDARY LAYER WITH MASS ADDITION,
AD-600 627 DIV. 9

AIR
SOUND
SPECIFIC HEAT AND SPEED OF SOUND DATA FOR IMPERFECT AIR,
AD-600 469 DIV. 25

AIR
SPECIFIC HEAT
SPECIFIC HEAT AND SPEED OF SOUND DATA FOR IMPERFECT AIR,
AD-600 469 DIV. 25

AIR BURST
SIMULATORS
MALFUNCTION INVESTIGATION OF SIMULATOR, PROJECTILE AIR BURST: M74,
AD-600 516 DIV. 22

AIR BURST
TOLERANCES (PHYSIOLOGY)
EFFECTS OF AMBIENT PRESSURE ON THE TOLERANCE OF MICE TO AIR BLAST,
AD-600 551 DIV. 14

AIR CONDITIONING EQUIPMENT
MILITARY PERSONNEL
HEAT-LOSS STUDY OF ARMY BARRACKS IN POLAR REGIONS AND DESCRIPTION OF TWO HEATING SYSTEMS,
AD-600 619 DIV. 13

AIR DROP OPERATIONS
MINIMUM AIRDROP ALTITUDES FOR MASS PARACHUTE DELIVERY OF PERSONNEL AND MATERIAL USING EXISTING STANDARD PARACHUTE EQUIPMENT,
AD-600 741 DIV. 1

AIR FORCE PERSONNEL
APTITUDE TESTS
PREDICTION BY CAREER FIELD OF FIRST TERM AIRMAN PERFORMANCE FROM SELECTION AND BASIC TRAINING VARIABLES,
AD-600 781 DIV. 23
DEVELOPMENT AND STANDARDIZATION OF THE AIR FORCE OFFICER QUALIFYING TEST 64,
AD-600 782 DIV. 28

AIR FORCE PERSONNEL
PERSONNEL MANAGEMENT
INTER-SERVICE CONFERENCE ON TECHNIQUES FOR DETERMINING THE MILITARY CAREER FORCE STRUCTURE, WASHINGTON, D. C, MAY 28-29, 1963,
AD-600 052 DIV. 23

AIR FORCE RESEARCH
INDEXES
OFFICE OF AEROSPACE RESEARCH CUMULATIVE INDEX FOR JANUARY 1959 THROUGH DECEMBER 1962,
AD-600 160 DIV. 30

AIR MASS ANALYSIS
DIFFERENTIAL EQUATIONS
COMPUTATION OF THE VERTICAL CIRCULATION IN A FRONTAL ZONE FROM THE QUASI-GEOSTROPHIC EQUATIONS,
AD-600 368 DIV. 2

AIR POLLUTION
MONITORS
CHARACTERISTICS OF AIR FILTER MEDIA USED FOR MONITORING AIRBORNE RADIOACTIVITY,
AD-600 292 DIV. 2

AIR POLLUTION
RADIOLOGICAL CONTAMINATION
MEASUREMENT OF RADIOLOGICAL CONTAMINATION OF THE ATMOSPHERE,
AD-600 371 DIV. 20

AIR TRAFFIC CONTROL SYSTEMS
AIR TRAFFIC CONTROLLERS
INVESTIGATION OF AIR TRAFFIC CONTROLLER JOB AIDS FOR THE AN/TSQ-47 SYSTEM,
AD-600 774 DIV. 5

AIR TRAFFIC CONTROL SYSTEMS
AIRPLANE LANDINGS
REGAL TEST PROGRAM SUPPORT:

ANTENNA RADIATION PATTERNS
X BAND
TWO-DIMENSIONAL SELF-FOCUSING ARRAY ANTENNA MODEL,
AD-600 017 DIV. 8

ANTENNAS
ANTENNA CONFIGURATIONS
NEW VOR COUNTERPOISE SYSTEM FOR REDUCTION OF SITING ERRORS,
AD-600 362 DIV. 8

ANTENNAS
ANTENNA RADIATION PATTERNS
ON A FUNDAMENTAL PRINCIPLE IN THE THEORY OF PLANAR ANTENNAS,
AD-600 765 DIV. 8

ANTENNAS
INTEGRATED CIRCUITS
RESEARCH ON TECHNIQUES FOR INTEGRATION OF ACTIVE ELEMENTS INTO ANTENNAS AND ANTENNA STRUCTURE,
AD-600 105 DIV. 8

ANTENNAS
PERFORMANCE
TWO-DIMENSIONAL SELF-FOCUSING ARRAY ANTENNA MODEL,
AD-600 017 DIV. 8
HIGH GAIN ANTENNA REALIZATION AND TRACKING STUDY UTILIZING PHASED ARRAY PARABOLIC ANTENNAS,
AD-600 651 DIV. 8

ANTHOXANTHIN PIGMENTS
PHOTOCHEMISTRY
SPECTRAL CHANGES DURING PHOTOBLEACHING OF RIBOFLAVIN PHOSPHATE,
AD-600 255 DIV. 4

ANTHROPOLOGY
BIBLIOGRAPHIES
BIBLIOGRAPHY OF REPORTS ISSUED BY THE BEHAVIORAL SCIENCES LABORATORY: ENGINEERING PSYCHOLOGY, TRAINING PSYCHOLOGY, ENVIRONMENTAL STRESS, SIMULATION TECHNIQUES, AND PHYSICAL ANTHROPOLOGY,
AD-600 804 DIV. 28

ANTHROPOMETRY
HUMAN ENGINEERING
FOUR MONOGRAPHS ON HUMAN MECHANICS -HUMAN ENGINEERING STUDIES,
AD-600 618 DIV. 28

ANTIFOULING COATINGS
LIQUID IMMERSION TESTS
SEA WATER IMMERSION TESTS OF AFRICAN WOOD UNCOATED AND COATED WITH NAVY FORMULA 105 OR 121 ANTIFOULING PAINT,
AD-600 349 DIV. 14

ANTIGEN-ANTIBODY REACTIONS
IMMUNITY
MECHANISM OF ADJUVANT EFFECT OF ENDOTOXINS IN ANTIBODY FORMATION,
AD-600 257 DIV. 14

ANTIMONY ALLOYS
INDIUM ALLOYS
EFFECTS OF PLASTIC DEFORMATION, ANNEALING, AND FATIGUE ON THE ELECTRICAL PROPERTIES OF THE SEMICONDUCTOR INDIUM ANTIMONIDE,
AD-600 256 DIV. 25

ANTIMONY ALLOYS
PHOTOCONDUCTIVITY
PHOTOCONDUCTIVITY OF GALLIUM ANTIMONIDE,
AD-600 178 DIV. 25

ANTIOXIDANTS
VAPORS
BIBLIOGRAPHY ON VAPOR PHASE CORROSION INHIBITORS FOR NONFERROUS AND FERROUS METALS,
AD-600 643 DIV. 17

ANTIRAIN AGENTS
MANUFACTURING METHODS
RAIN REPELLENT,
AD-600 173 DIV. 14

APPROACH INDICATORS
FLIGHT TESTING
REGAL TEST PROGRAM SUPPORT: FLIGHT TESTING,
AD-600 826 DIV. 19

APTITUDE TESTS
AIR FORCE PERSONNEL
PREDICTION BY CAREER FIELD OF FIRST TERM AIRMAN PERFORMANCE FROM SELECTION AND BASIC TRAINING VARIABLES,
AD-600 781 DIV. 23
DEVELOPMENT AND STANDARDIZATION OF THE AIR FORCE OFFICER QUALIFYING TEST 64,
AD-600 782 DIV. 28

AQUATIC ANIMALS
MARINE BIOLOGY
SESSILE ORGANISM ACCUMULATION IN A NEARSHORE WATER COLUMN DURING A ONE YEAR PERIOD,
AD-600 718 DIV. 14

ARCTIC OCEAN
METEOROLOGY
EVAPORATION AND SENSIBLE HEAT FLUX OVER THE ARCTIC OCEAN,
AD-600 015 DIV. 2

ARCTIC REGIONS
ICE
NORTH AMERICAN ARCTIC AND SUBARCTIC ICE THICKNESS OBSERVATIONS,
AD-600 483 DIV. 2

ARMING DEVICES
GUIDED MISSILE WARHEADS
SOLID-STATE ARM-SAFE DEVICE FOR MISSILE WARHEADS,
AD-600 558 DIV. 22

ARMY PERSONNEL
LEADERSHIP
VALUES ASSOCIATED WITH MILITARY CAREER MOTIVATION,
AD-600 037 DIV. 28

ARMY PERSONNEL
PSYCHOMETRICS
PREDICTION OF OFFICER PERFORMANCE,
AD-600 038 DIV. 28

ASPHERICAL LENSES
PRODUCTION
ASPHERIC OPTICAL ELEMENTS PROGRAM -PRODUCTION AND MANUFACTURING METHODS,
AD-600 004 DIV. 24

ASTRONAUTS
SPACE FLIGHT
STUDY OF THE INFLUENCE OF VARIOUS FACTORS OF COSMIC FLIGHT ON THE HUMAN ORGANISM, BOTH AS REGARDS PROLONGED STAYING IN ORBIT, AND AS TO COMPARING THE EFFECTS OF THESE FACTORS ON THE ORGANISMS OF MAN AND WOMAN,
AD-600 610 DIV. 16

ASTROPHYSICS
MOON
OBSERVATIONS OF THE MOON BASED ON LASER OPTICS AND RADAR ASTRONOMY,
AD-600 508 DIV. 2

ASTROPHYSICS
NEBULAE
THE DISTRIBUTION OF GASES IN THE PROTOPLANETARY NEBULA,
AD-600 023 DIV. 2

ASTROPHYSICS
STARS
INVESTIGATION OF O AND B SPECTRA OF STARS,
AD-600 870 DIV. 2

ATMOSPHERE
ELECTROMAGNETIC WAVE REFLECTION
PARTIAL REFLECTIONS IN THE ATMOSPHERE AND LONG-DISTANCE PROPAGATION,
AD-600 685 DIV. 8

ATMOSPHERE
OPTICAL PROPERTIES
STUDY OF VISIBILITY CONDITIONS IN MALAYA AND VARIOUS ASPECTS OF PHYSICAL GEOGRAPHY AND METEOROLOGY,
AD-600 712 DIV. 2

ATMOSPHERE
SCIENTIFIC RESEARCH
VERTICAL DISTRIBUTION OF DUST, IONS, AND OZONE IN THE ATMOSPHERE,
AD-600 598 DIV. 2

ATMOSPHERE
SYMPOSIA
SEMINARS ON THE STRATOSPHERE, MESOPHERE AND POLAR METEOROLOGY,
AD-600 464 DIV. 2

ATMOSPHERE ENTRY
AERODYNAMIC HEATING
INVISCID, NONADIABATIC FLOW ABOUT BLUNT BODIES UNDER CERTAIN RE-ENTRY CONDITIONS,
AD-600 592 DIV. 9

ATMOSPHERE ENTRY
REENTRY VEHICLES
RE-ENTRY PHYSICS -INTERACTION OF VEHICLES IN EARLY RE-ENTRY ENVIRONMENT,
AD-600 669 DIV. 12

ATMOSPHERE ENTRY
SIMULATION
TECHNIQUE FOR SEVERE RADIATIVE AND CONVECTIVE HEATING ENVIRONMENTS FOR MATERIALS EVALUATION,
AD-600 021 DIV. 9

ATMOSPHERE MODELS
UPPER ATMOSPHERE
SEMI-THEORETICAL MODEL FOR ATMOSPHERIC PROPERTIES FROM 90 TO 10,000 KM,
AD-600 472 DIV. 2

ATMOSPHERIC MOTION
DISTRIBUTION
TATARSKIAN CORRELATION FUNCTION FOR ARBITRARY TURBULENCE CONDITIONS,
AD-600 443 DIV. 8

ATMOSPHERIC MOTION
NUMERICAL ANALYSIS
COMPUTATION OF THE VERTICAL CIRCULATION IN A FRONTAL ZONE FROM THE QUASI-GEOSTROPHIC EQUATIONS,
AD-600 368 DIV. 2

ATMOSPHERIC SOUNDING
HANDBOOKS
HANDBOOK ON THE HIGH-ALTITUDE VERTICAL-HORIZONTAL SOUNDING OF THE ATMOSPHERE IN THE IL-28 AIRCRAFT,
AD-600 134 DIV. 1

ATMOSPHERIC SOUNDING
SOUNDING ROCKETS
TECHNIQUES AND EQUIPMENT FOR AN AIR LAUNCHED ROCKET SOUNDING SYSTEM COMPATIBLE WITH THE AN/AMQ-19 METEOROLOGICAL SYSTEM,
AD-600 400 DIV. 2

ATOMIC ORBITALS
FIELD THEORY
THE DIRECT DETERMINATION OF NATURAL ORBITALS AND NATURAL EXPANSION COEFFICIENTS OF MANY ELECTRON WAVE FUNCTIONS. I. NATURAL ORBITALS IN THE GEMINAL PRODUCT APPROXIMATION,
AD-600 166 DIV. 4

ATOMIC ORBITALS
MOMENTUM
CALCULATIONS OF WAVE FUNCTIONS AND TRANSITION PROBABILITIES,
AD-600 374 DIV. 25

ATOMIC SPECTROSCOPY
SCIENTIFIC RESEARCH
SUMMARY OF RESEARCH ON NUCLEAR MAGNETIC RESONANCE, ATOMIC SPECTROSCOPY, LOW-TEMPERATURE PHENOMENA, AND NUCLEAR STRUCTURE,
AD-600 874 DIV. 20

ATTITUDE CONTROL SYSTEMS
PNEUMATIC SYSTEMS
SATELLITE ATTITUDE CONTROL SYSTEMS UTILIZING LOW THRUST, COLD GAS, MASS EXPULSION SYSTEMS,
AD-600 719 DIV. 12

ATTITUDES
GROUP DYNAMICS
DIFFERENTIAL RESPONSE TO APPRAISAL AND GOAL SETTING AS A FUNCTION OF SELF - GROUP INTERACTION, AND TASK ORIENTATION,
AD-600 296 DIV. 28

ATTITUDES
PSYCHOMETRICS
PSYCHOLOGICAL RESEARCH FOR DESCRIBING BELIEFS, ATTITUDES, AND JUDGEMENTS,
AD-600 441 DIV. 28
SEARCH FOR PLANETARY OPTICAL EMISSION, AND STUDY OF FLARE ACTIVITY OF NEARBY STARS,
AD-600 154 DIV. 2

AUTOMATIC PILOTS
AIRPLANE LANDINGS
INTEGRATION OF HONEYWELL MODEL 7102 RADAR ALTIMETER INTO THE FAA AUTOMATIC LANDING SYSTEM,
AD-600 827 DIV.
EVALUATION OF THE BLEU AUTOMATIC LANDING SYSTEM,
AD-600 829 DIV. 1

AUTOMATIC PILOTS
DESIGN
FLEXIBLE FLIGHT VEHICLE TRANSFER FUNCTION FACTORS FOR USE IN AUTOPILOT PRELIMINARY DESIGN,
AD-600 672 DIV. 1

AUTOMATIC PILOTS
PERFORMANCE (ENGINEERING)
ANALYSIS OF TWO NONLINEAR FLIGHT CONTROL SYSTEMS, PART I. LIAPOUNOV-LURJE APPROACH TO A SIMPLIFIED PITCH RATE AUTOPILOT. PART II. ANALYSIS OF A HIGH-GAIN ADAPTIVE PITCH RATE AUTOPILOT,
AD-600 771 DIV. 1

AUTONOMIC NERVOUS SYSTEM
BLOOD CIRCULATION
EFFECTS OF STIMULATION OF VASODILATOR CENTERS OF HYPOTHALAMUS ON THE BLOOD FLOW IN THE FEMORAL ARTERIES OF DOGS,
AD-600 380 DIV. 16

AVIATION ACCIDENTS
AVIATION SAFETY
ROLE OF OPTICAL DEVICES IN MID-AIR COLLISION PREVENTION,
AD-600 326 DIV. 1

AVIATION SAFETY
OPTICAL EQUIPMENT
ROLE OF OPTICAL DEVICES

FLIGHT TESTING,
AD-600 826 DIV. 19

AIR TRAFFIC CONTROL SYSTEMS
LANDING AIDS
INTERNATIONAL AVIATION R AND D SYMPOSIUM (2ND)I ALL WEATHER LANDING SYSTEMS, SEPTEMBER 16-18, 1963,
AD-600 093 DIV. 1

AIR TRAFFIC CONTROL SYSTEMS
TRANSPONDERS
SLATE III AND SLATE III MARK I LIGHT-WEIGHT ALTITUDE TRANSMISSION TRANSPONDERS,
AD-600 822 DIV. 1

AIR TRAFFIC CONTROLLERS
AIR TRAFFIC CONTROL SYSTEMS
INVESTIGATION OF AIR TRAFFIC CONTROLLER JOB AIDS FOR THE AN/TSQ-47 SYSTEM,
AD-600 774 DIV. 5

AIRCRAFT
GLIDERS
ENGINEERING SPECIFICATIONS AND AERODYNAMIC CHARACTERISTICS OF SOVIET KAI-19 GLIDER,
AD-600 818 DIV. 1

AIRCRAFT
METEOROLOGICAL INSTRUMENTS
HANDBOOK ON THE HIGH-ALTITUDE VERTICAL-HORIZONTAL SOUNDING OF THE ATMOSPHERE IN THE IL-28 AIRCRAFT,
AD-600 134 DIV. 1

AIRCRAFT CANOPIES
ACRYLIC RESINS
THERMAL RADIATION RESISTANCE OF STRETCHED ACRYLIC PLASTICS USED FOR AIRCRAFT CANOPIES,
AD-600 750 DIV. 19

AIRCRAFT FIRE CONTROL SYSTEMS
TRAINING DEVICES
DESIGN AND DEVELOPMENT OF THE AN/ASG21-T1 FIRE CONTROL SYSTEM TRAINER,
AD-600 834 DIV. 8

AIRFOILS
LIFT
AN ASYMPTOTIC METHOD FOR DETERMINING THE LIFT DISTRIBUTION OF A SWEPT-BACK WING OF FINITE SPAN,
AD-600 422 DIV. 9

AIRFRAMES
MODELS (SIMULATIONS)
DYNAMIC MODELING OF COMPLEX STRUCTURES AS A METHOD FOR THE PREDICTION OF VIBRATORY RESPONSE AND STRESS IN FLIGHT VEHICLE STRUCTURES,
AD-600 234 DIV. 1

AIRFRAMES
PRODUCTION
DEVELOPMENT OF IMPROVED FABRICATION METHODS, PROCESSES, AND TECHNIQUES FOR PRODUCING TYPICAL AIRCRAFT SHAPES FROM BERYLLIUM,
AD-600 520 DIV. 17

AIRPLANE ENGINE OILS
IGNITION
IGNITION CHARACTERISTICS OF FUELS AND LUBRICANTS,
AD-600 002 DIV. 10

AIRPLANE MODELS
VIBRATION
DYNAMIC MODELING OF COMPLEX STRUCTURES AS A METHOD FOR THE PREDICTION OF VIBRATORY RESPONSE AND STRESS IN FLIGHT VEHICLE STRUCTURES,
AD-600 234 DIV. 1

ALBEDO
NEUTRON SCATTERING
SEMIEMPIRICAL FORMULA FOR DIFFERENTIAL DOSE ALBEDO FOR NEUTRONS ON CONCRETE,
AD-600 684 DIV. 20

ALCOHOLS
TOXICITY
TOXICITY OF CERTAIN ALCOHOLS AND MELAMINE-FORMALDEHYDE RESINS BASED THEREON,
AD-600 812 DIV. 16

ALGEBRAIC TOPOLOGY
DECOMPOSITION OF CONES IN MODULES OVER ORDERED RINGS,
AD-600 735 DIV. 15
SYMMETRY AND ESSENTIAL SYMMETRY IN GRADUATED FIELDS,
AD-600 738 DIV. 15

ALGEBRAS
CANONICAL REPRESENTATIONS OF CHAIN EVENTS,
AD-600 734 DIV. 15

ALGEBRAS
THEOREMS
ON BANACH ALGEBRA WITH SIGMA SYMBOL II,
AD-600 214 DIV. 15

ALKALOIDS
SKELETAL MUSCLE RELAXANTS
INVESTIGATION OF THE MECHANISM OF ACTION OF ANANODINE ON MAMMALIAN SKELETAL MUSCLE,
AD-600 282 DIV. 16

ALKANES
OXIDATION
CHLORINE PHOTOSENSITIZED OXIDATION OF ETHANE AT LOW TEMPERATURES,
AD-600 939 DIV. 4

ALKYNES
POLYMERS
SYNTHESIS AND EVALUATION OF POLYMERS WITH SPECIAL PROPERTIES,
AD-600 063 DIV. 4

ALLOYS
BIBLIOGRAPHIES
DEFENSE METALS INFORMATION CENTER SELECTED ACCESSIONS ON HIGH-STRENGTH ALLOYS, LIGHT METALS, NONMETALLICS, REFRACTORY METALS -MAY 1964,
AD-600 803 DIV. 17

ALL-WEATHER AVIATION
AIRCRAFT LANDINGS
INTERNATIONAL AVIATION R AND D SYMPOSIUM (2ND)I ALL WEATHER LANDING SYSTEMS, SEPTEMBER 16-18, 1963,
AD-600 093 DIV. 1

ALL-WEATHER AVIATION
AIRPLANE LANDINGS
REGAL TEST PROGRAM SUPPORT: FLIGHT TESTING,
AD-600 826 DIV. 19
INTEGRATION OF HONEYWELL MODEL 7182 RADAR ALTIMETER INTO THE FAA AUTOMATIC LANDING SYSTEM,
AD-600 827 DIV. 1
EVALUATION OF THE BLEU AUTOMATIC LANDING SYSTEM,
AD-600 829 DIV. 1

ALL-WEATHER AVIATION
METEOROLOGICAL PARAMETERS
NATIONAL AVIATION METEOROLOGICAL REQUIREMENTS THROUGH 1975,
AD-600 109 DIV. 1

ALTIMETERS
EFFECTIVENESS
STUDY OF INTEGRITY, RELIABILITY, AND ACCURACY OF AUTOMATIC HEIGHT REPORTING SYSTEM VIA ATC RADAR BEACON SYSTEM,
AD-600 137 DIV. 1

ALTIMETERS
FLIGHT TESTS
INTEGRATION OF HONEYWELL MODEL 7182 RADAR ALTIMETER INTO THE FAA AUTOMATIC LANDING SYSTEM,
AD-600 827 DIV. 1

ALUMINUM
BONDING
EFFECT OF SURFACE PREPARATION AND ELEVATED TEMPERATURE STORAGE ON ADHESIVE BONDS TO ALUMINUM,
AD-600 033 DIV. 19

ALUMINUM
NEUTRON FLUX
NEUTRON REFLECTION AND FLUX VERSUS DEPTH FOR ALUMINUM WITH AN APPENDIX, NEUTN DOSE TRANSMISSION VERSUS THICKNESS,
AD-600 755 DIV. 20

ALUMINUM ALLOYS
COMPRESSIVE PROPERTIES
COMPRESSION PROPERTIES OF SELECTED ALUMINUM ALLOYS AFTER MULTIPLE TEMPERATURE EXPOSURES,
AD-600 035 DIV. 17

ALUMINUM ALLOYS
CORROSION
THE COMPATIBILITY OF WELDED STRUCTURAL MATERIALS WITH CHLORINE TRIFLUORIDE, PERCHLORYL FLUORIDE AND A MIXTURE OF THESE,
AD-600 000 DIV. 17

ALUMINUM ALLOYS
CYLINDRICAL BODIES
CELLULAR ALUMINUM FOR USE IN ENERGY DISSIPATION SYSTEMS,
AD-600 112 DIV. 17

ALUMINUM ALLOYS
MECHANICAL PROPERTIES
INFLUENCE OF SECTION SIZE ON THE MECHANICAL PROPERTIES AND FRACTURE TOUGHNESS OF 7075-T6 ALUMINUM, 6AL-4V-2SN TITANIUM, AND AISI 4340 STEEL,
AD-600 846 DIV. 17

ALUMINUM ALLOYS
POSITIONING DEVICES (MACHINERY)
BREAKING-STRENGTH AND ENDURANCE TESTS OF ALUMINUM TURNBUCKLES FOR AIRCRAFT,
AD-600 169 DIV. 1

ALUMINUM ALLOYS
REFRACTORY COATINGS
FEASIBILITY STUDIES FOR APPLICATION OF STABLE REFRACTORY COATING COMPOSITIONS TO PROTECT REFRACTORY METAL ALLOYS,
AD-600 152 DIV. 17

ALUMINUM COMPOUNDS
PHOSPHATES
DOSIMETERS OF IONIZING RADIATION BASED ON THE MEASUREMENT OF THERMOLUMINESCENCE OF ALUMOPHOSPHATE GLASSES ('IKS' DOSIMETERS),
AD-600 493 DIV. 20

AMERICIUM
NUCLEI
INSTANTANEOUS DECOMPOSITION OF AMERICIUM NUCLEI,
AD-600 489 DIV. 20

AMINO ACIDS
DIAGNOSTIC AGENTS
QUICK METHOD TO DETERMINE TOTAL ALPHA-AMINO NITROGEN IN URINE AND BLOOD SERUM,
AD-600 808 DIV. 16

AMINO PLASTICS
TOXICITY
TOXICITY OF CERTAIN ALCOHOLS AND MELAMINE-FORMALDEHYDE RESINS BASED THEREON,
AD-600 812 DIV. 16

AMMONIUM COMPOUNDS
BURNING RATE
TEMPERATURE DISTRIBUTION DURING BURNING OF AMMONIUM PERCHLORATE,
AD-600 507 DIV. 4

AMPLIFIERS
DETECTORS
X-BAND SOLID-STATE DETECTOR/AMPLIFIER,
AD-600 279 DIV. 8

AMPLIFIERS
TRIODES
TRANSIENT GAMMA AND NEUTRON RADIATION EFFECTS ON BASIC TRIODE AMPLIFIERS,
AD-600 770 DIV. 8

ANALOG SYSTEMS
EAR
RESEARCH AND INVESTIGATION ON THE TRANSMISSION LINE ANALOG OF SOME FUNCTIONS OF THE COCHLEA,
AD-600 742 DIV. 30

ANALOG-DIGITAL COMPUTERS
STEREOSCOPES
OPTIMIZATION OF A DIGITAL AUTOMATIC MAP COMPILATION SYSTEM,
AD-600 117 DIV. 30

ANALYSIS OF VARIANCE
BIVARIATE REGRESSION WHEN BOTH VARIABLES ARE RANDOM,
AD-600 309 DIV. 15

ANESTHESIA
MEDICAL EQUIPMENT
APPARATUS FOR ELECTRONARCOSIS,
AD-600 147 DIV. 16

ANGLE OF ATTACK
AERODYNAMIC HEATING
EFFECT OF ANGLE ATTACK ON LAMINAR CONNECTIVE HEAT TRANSFER ON SHARP AND BLUNT CONES,
AD-600 628 DIV. 9

ANTENNA COMPONENTS
DESIGN
PRELIMINARY DESIGN STUDY OF A FLAT PLATE REFLECTOR AND SUPPORT UNIT,
AD-600 096 DIV. 8

ANTENNA CONFIGURATIONS
OPTIMIZATION
INFORMATION THEORETIC EVALUATION AND OPTIMIZATION OF ANTENNA SYSTEMS,
AD-600 386 DIV. 8

ANTENNA RADIATION PATTERNS
LOOP ANTENNAS
NEW VOR COUNTERPOISE SYSTEM FOR REDUCTION OF SITING ERRORS,
AD-600 362 DIV. 8

ANTENNA RADIATION PATTERNS
MATHEMATICAL PREDICTION
ON A FUNDAMENTAL PRINCIPLE IN THE THEORY OF PLANAR ANTENNAS,
AD-600 765 DIV. 8

ANTENNA RADIATION PATTERNS
RADIOFREQUENCY INTERFERENCE
ELIMINATION OF UNDESIRED RADIATION AND REDUCTION OF RADIO FREQUENCY INTERFERENCE OF DIRECTIONAL ANTENNAS BY MEANS OF RADAR ABSORBER MATERIALS,
AD-600 652 DIV. 8

BONE MARROW
RADIOTHERAPY
SUMMARY OF THE EFFECTS OF WHOLE BODY IRRADIATION ON 112 CASES OF CANCER,
AD-600 299 DIV. 14

BORIDES
HEAT OF FORMATION
HEATS OF FORMATION OF METALLIC BORIDES, IN PARTICULAR, AL AND ZR BORIDES, BY FLUORINE BOMB CALORIMETRY,
AD-600 396 DIV. 4

BORIDES
MICROSTRUCTURE
SINGLE CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE; MICROSTRUCTURAL FEATURES AND MICROHARDNESS,
AD-600 519 DIV. 25

BOUNDARY LAYER
EQUATIONS
EQUATIONS OF MOTION IN A MULTICOMPONENT, CHEMICALLY REACTING GAS,
AD-600 491 DIV. 9

BOUNDARY LAYER
FLAT PLATE MODELS
THE LOCAL METHOD FOR DIRECT MEASUREMENT OF THE BOUNDARY-LAYER VELOCITY PROFILE OF A NONUNIFORMLY HEATED FLAT PLATE,
AD-600 809 DIV. 9

BOUNDARY VALUE PROBLEMS
ELASTICITY
EXPERIMENTAL SOLUTION OF SOME MIXED BOUNDARY VALUE PROBLEMS USING TWO MODELS,
AD-600 546 DIV. 18

BOUNDARY VALUE PROBLEMS
OPERATORS (MATHEMATICS)
ON A MIXED BOUNDARY VALUE PROBLEM FOR LINEAR THIRD ORDER HYPERBOLIC PARTIAL DIFFERENTIAL EQUATIONS,
AD-600 101 DIV. 18

BOUNDARY VALVE PROBLEMS
ELASTICITY
NUMERICAL TREATMENT OF AN INTEGRAL EQUATION DERIVED IN THE ANALYSIS OF THE STRESS FIELD IN A CYLINDER CONTAINING A PENNY-SHAPED CRACK,
AD-600 497 DIV. 25

BRAIN
BLOOD CIRCULATION
METHOD OF CONTINUOUS REGISTRATION OF LOCAL CEREBRAL BLOOD FLOW IN ACUTE AND CHRONIC EXPRIMENTS,
AD-600 823 DIV. 14

BRASS
AGING (MATERIALS)
AGING OF BRASS BY DISSOLUTION OF THE EXCESS PHASES,
AD-600 814 DIV. 17

BREATHING APPARATUS
CLOSED ECOLOGICAL SYSTEMS
CIRCULATING DEVICE FOR CLOSED CIRCUIT RESPIRATORY SYSTEM,
AD-600 467 DIV. 14

BRITTLENESS
CHLORIDES
EMBRITTLEMENT OF STEEL BY ORGANIC LIQUIDS,
AD-600 695 DIV. 17

BRONCHI
ABSORPTION (BIOLOGICAL)
PROCEDURE OF WASHING A LOBE OF THE LUNG WITH AQUEOUS SOLUTIONS OF CHEMICALS AND BIOLOGICAL PRODUCTS,
AD-600 424 DIV. 14

BUOYS
MOORING
PERFORMANCE OF DEEP-SEA MOORED BUOY SYSTEMS,
AD-600 620 DIV. 2

BUTADIENES
POLYMERS
THE FIELD EVALUATION OF AN EXPERIMENTAL AIR DRY FUEL RESISTANT COATING,
AD-600 030 DIV. 14

CALCIUM COMPOUNDS
OXIDES
MASS SPECTROMETRIC DETERMINATION OF THE DISSOCIATION ENERGY OF THE MOLECULES MGO, CAO, SRO AND SR2O,
AD-600 442 DIV. 4

CANCER
IMMUNITY
IMMUNOLOGICAL, BIOLOGICAL AND CYTOLOGICAL PROPERTIES OF MALIGNANT TUMORS IN HETEROTRANSPLANTATION AND EXPLANTATION,
AD-600 787 DIV. 14

CAPACITORS
ELECTRICAL PROPERTIES
DIELECTRIC THIN FILMS WITH INCREASED BREAKDOWN STRENGTH USED IN CAPACITORS,
AD-600 316 DIV. 8

CAPACITORS
PRODUCTION
PRODUCTION ENGINEERING MEASURE FOR RESISTOR CAPACITOR MICROELEMENTS FOR MICROMODULES,
AD-600 127 DIV. 8
DEVELOPMENT OF THIN ORGANIC ROLLED FILM CAPACITOR,
AD-600 317 DIV. 8

CARBON BLACK
PRODUCTION CONTROL
PROCESS FOR PRODUCING CARBON BLACK FOR USE IN ORGANIC DEPOLARIZER BATTERIES,
AD-600 250 DIV. 7

CARBOXYLIC ACIDS
STEEL
EMBRITTLEMENT OF STEEL BY ORGANIC LIQUIDS,
AD-600 695 DIV. 17

CASTING
MECHANICAL PROPERTIES
TENSILE AND IMPACT PROPERTIES OF INVESTMENT CAST STEELS,
AD-600 455 DIV. 22

CASTINGS
MATERIAL FORMING
CELLULAR ALUMINUM FOR USE IN ENERGY DISSIPATION SYSTEMS,
AD-600 112 DIV. 17

CATALYSIS
SEMICONDUCTORS
SEMICONDUCTOR CATALYSIS; SIMULTANEOUS MEASUREMENT OF KINETICS AND SURFACE ELECTRICAL PROPERTIES,
AD-600 080 DIV. 4

CATHODE RAY TUBES
ANALYSIS
FOUR BASIC METHODS OF CATHODE RAY TUBE TESTING SELECTED BY A JOINT INDUSTRY-GOVERNMENT COMMITTEE,
AD-600 517 DIV. 8

CAVITATION
DAMAGE
ON TESTING MATERIALS FOR CAVITATION DAMAGE RESISTANCE,
AD-600 016 DIV. 4

CAVITATION NOISE
ACOUSTIC PROPERTIES
THRESHOLDS OF ACOUSTIC CAVITATION,
AD-600 839 DIV. 9

CELLS (BIOLOGY)
WOUNDS & INJURIES
CYTOLOGICAL ASPECTS OF INJURY AND REPAIR,
AD-600 703 DIV. 14

CELLULOSE
SURFACE TEMPERATURES
MEASUREMENT OF THE TEMPERATURE OF THE THERMALLY IRRADIATED SURFACE OF ALPHA CELLULOSE,
AD-600 768 DIV. 10

CERAMIC MATERIALS
FILTERS (ELECTROMAGNETIC WAVE)
PRODUCTION ENGINEERING MEASURE FOR CERAMIC FILTERS,
AD-600 382 DIV. 8

CERAMIC MATERIALS
INTERMETALLIC COMPOUNDS
REFRACTORY CERAMICS OF INTEREST IN AEROSPACE STRUCTURAL APPLICATIONS -A MATERIALS SELECTION HANDBOOK,
AD-600 588 DIV. 14

CESIUM
OXIDATION
OXIDATION REACTION KINETICS OF CESIUM AT LOW TEMPERATURES AND PRESSURES,
AD-600 428 DIV. 4

CESIUM
PHOTOCATHODES
PHOTOELECTRIC EFFECT IN SILVER-OXYGEN-CESIUM PHOTOCATHODES,
AD-600 224 DIV. 8

CHARGES (EXPLOSIVE)
DETONATIONS
ANALYSIS OF THE OPTICAL DETERMINATION OF DETONATION VELOCITY IN SHORT CHARGES,
AD-600 059 DIV. 22

CHECK VALVES
TESTS
STRUCTURAL INTEGRITY, ACCELERATED CORROSION AND FLOW CAPACITY TESTS OF PARKER AIRCRAFT COMPANY ONE INCH FUEL CHECK VALVE,
AD-600 717 DIV. 1

CHEMICAL REACTIONS
ENERGY
MECHANOCHEMISTRY OF COUPLED CONTRACTILE AND CHEMICAL RATE PROCESSES,
AD-600 541 DIV. 4

CHEMICAL WARFARE AGENTS
DECONTAMINATION
STUDY OF CHEMICAL AGENT DECONTAMINATION SYSTEMS FOR MULTIPURPOSE USE,
AD-600 061 DIV. 3

CHEMICAL WARFARE AGENTS
OXIDATION
STUDY OF CHEMICAL AGENT DECONTAMINATION SYSTEMS FOR MULTIPURPOSE USE,
AD-600 061 DIV. 3

CHEMISTRY
REVIEWS
AFOSR CHEMISTRY PROGRAM REVIEW FOR FY '63,
AD-600 823 DIV. 4

CHLORINATION
PHOTOCHEMISTRY
CHLORINE PHOTOSENSITIZED OXIDATION OF ETHANE AT LOW TEMPERATURES,
AD-600 439 DIV. 4

CHROMOSOMES
MUTATIONS
CHANGES IN CHROMOSOMES OF SPORES OF TRANDESCANTIA PALUDOSA WHICH WERE PUT ON VOSTOK 3 AND 4 ARE SUMMARIZED,
AD-600 802 DIV. 14

CIRCUIT INTERCONNECTIONS
MAINTAINABILITY
PROBLEMS OF FAULT DIAGNOSIS OF COMPUTER MICROCIRCUITRY BY USE OF BOOLEAN FUNCTION,
AD-600 547 DIV. 8

CIRCUITS
CURRENT AMPLIFIERS
EVALUATION OF DIFFERENTIAL AMPLIFIER CIRCUITS USED IN ELECTROPHYSIOLOGICAL RESEARCH,
AD-600 124 DIV. 16

CIRCUITS
THEORY
TIME-DOMAIN SYNTHESIS PROBLEM IN ELECTRICAL NETWORK THEORY,
AD-600 236 DIV. 8

CIVIL DEFENSE SYSTEMS
ATTITUDES
COMPARISON OF RESPONSES TO QUESTIONNAIRE ON REACTION TO THE FALLOUT PROTECTION HANDBOOK,
AD-600 438 DIV. 28

CIVIL DEFENSE SYSTEMS
PUBLIC OPINION
STUDY DESIGN AND DESCRIPTIONS OF NINE AMERICAN COMMUNITIES IN WHICH A SURVEY WAS MADE ON THE FALLOUT SHELTER ISSUE,
AD-600 751 DIV. 32
PUBLIC OPINION SURVEY OF NINE AMERICAN COMMUNITIES CONCERNING THE FALLOUT-SHELTER ISSUE -METHODS, FINDINGS, AND IMPLICATIONS,
AD-600 752 DIV. 32

CIVIL DEFENSE SYSTEMS
SHELTERS
RECOMMENDED CHANGES IN INSTRUMENTS FOR TESTING FOR ENVIRONMENTAL HAZARDS IN SHELTERS,
AD-600 759 DIV. 19

CIVIL ENGINEERING
UNDERWATER
INFORMATION ON ENVIRONMENTS, SYSTEMS, AND TECHNIQUES RELATIVE TO CONSTRUCTION IN DEEP OCEAN AREAS,
AD-600 304 DIV. 13

CLIMATOLOGY
TABLES
TEMPERATURE AND HUMIDITY REGIMES IN THE ZONE BETWEEN 35 DEGREES N AND 35 DEGREES S,
AD-600 318 DIV. 2

CLOSED ECOLOGICAL SYSTEMS
BREATHING APPARATUS
CIRCULATING DEVICE FOR CLOSED CIRCUIT RESPIRATORY SYSTEM,
AD-600 467 DIV. 14

CLOSED ECOLOGICAL SYSTEMS
HYDROGEN
DETECTION OF HYDROGEN ABOARD AEROSPACE FLIGHT VEHICLES,
AD-600 153 DIV. 4

CLOUD COVER
DIURNAL VARIATIONS
DAILY VARIATION OF CLOUDINESS IN THE SOVIET UNION,
AD-600 525 DIV. 2

CLOUD COVER
VORTICES
THEORETICAL AND OBSERVATIONAL

IN MID-AIR COLLISION PREVENTION,
AD-600 326 DIV. 1

BACTERIA
PETROLEUM
MICROORGANISMS IN PETROLEUM PRODUCTS,
AD-600 232 DIV. 10

BALANCES
GRAVITY
GEODETIC EXPERIMENT BY MEANS OF A TORSION BALANCE,
AD-600 012 DIV. 2

BALLISTICS
GUIDED MISSILES
ANALYTIC SOLUTIONS TO THE EQUATIONS OF MOTION OF MISSILES HAVING SIX DEGREES OF FREEDOM,
AD-600 544 DIV. 12

BALLISTICS
TRAJECTORIES
CHARTS FOR DETERMINING THE CHARACTERISTICS OF BALLISTIC VEHICLES TRAVELING IN A VACUUM ABOUT A NONROTATING, SPHERICAL EARTH,
AD-600 087 DIV. 22

BALLOONS
HELIUM
BALLOON PROJECT: SECOND FLIGHT OF STRATOSCOPE II AND RELATED DATA,
AD-600 410 DIV. 2

BALOONS
ASCENT TRAJECTORIES
RELATIONSHIP BETWEEN TEMPERATURE LAPSE RATE AND BALLOON ASCENT RATE,
AD-600 433 DIV. 1

BATTERIES + COMPONENTS
CARBON BLACK
PROCESS FOR PRODUCING CARBON BLACK FOR USE IN ORGANIC DEPOLARIZER BATTERIES,
AD-600 250 DIV. 7

BATTERY CHARGES
PORTABLE
PORTABLE BATTERY CHARGERS,
AD-600 044 DIV. 7

BEACHES
RIVERS
COASTLINE OF THE COLUMBIA RIVER BETWEEN OREGON AND WASHINGTON,
AD-600 448 DIV. 2

BEARINGS
FOILS
INTERIOR AND EXIT REGION FILM THICKNESS MEASUREMENTS OF SELF-ACTING FOIL BEARING,
AD-600 657 DIV. 24

BENZOATES
CHEMICAL REACTIONS
ADDITION AND DISPLACEMENT REACTIONS WITH UNSATURATED HYDROCARBONS,
AD-600 223 DIV. 4

BENZOATES
STEREOCHEMISTRY
ADDITION AND DISPLACEMENT REACTIONS WITH UNSATURATED HYDROCARBONS,
AD-600 223 DIV. 4

BERYLLIUM
DEFORMATION
DEFORMATION CHARACTERISTICS OF BERYLLIUM AND OTHER REFRACTORY METALS AND ALLOYS,
AD-600 363 DIV. 17
DEVELOPMENT OF IMPROVED FABRICATION METHODS, PROCESSES, AND TECHNIQUES FOR PRODUCING TYPICAL AIRCRAFT SHAPES FROM BERYLLIUM,
AD-600 520 DIV. 17

BERYLLIUM COMPOUNDS
OXIDES
PRODUCTION ENGINEERING MEASURE FOR BERYLLIUM OXIDE AND PARTS PRODUCED FROM IMPORTED ORES,
AD-600 126 DIV. 8

BESSEL FUNCTIONS
POLYNOMIALS
A PROCEDURE FOR CALCULATING THE BESSEL FUNCTIONS J SUB NU (X)
AD-600 111 DIV. 15

BETATRONS
PLASMA PHYSICS
NEUTRON REFLECTION AND FLUX VERSUS DEPTH FOR ALUMINUM, AND STATISTICS ON NEUTRON DOSE TRANSMISSION VERSUS THICKNESS,
AD-600 741 DIV. 20
STUDIES AND INSTRUMENTATION FOR ACCELERATING PARTICLES IN A PLASMA,
AD-600 741 DIV. 20

BIBLIOGRAPHIES
BIBLIOGRAPHY ON THE EFFECTS OF MICROORGANISMS ON RUBBER DETERIORATION,
AD-600 644 DIV. 14

BIBLIOGRAPHIES
AERODYNAMIC CHARACTERISTICS
AEROSONICS BIBLIOGRAPHY,
AD-600 458 DIV. 9

BIBLIOGRAPHIES
ANTIOXIDANTS
BIBLIOGRAPHY ON VAPOR PHASE CORROSION INHIBITORS FOR NONFERROUS AND FERROUS METALS,
AD-600 643 DIV. 17

BIBLIOGRAPHIES
BEHAVIOR
BIBLIOGRAPHY OF REPORTS ISSUED BY THE BEHAVIORAL SCIENCES LABORATORY! ENGINEERING PSYCHOLOGY, TRAINING PSYCHOLOGY, ENVIRONMENTAL STRESS, SIMULATION TECHNIQUES, AND PHYSICAL ANTHROPOLOGY,
AD-600 804 DIV. 28

BIBLIOGRAPHIES
FUNGUSPROOFING
CONTROL OF MICROBIAL GROWTH ON LEATHER AND TEXTILES,
AD-600 529 DIV. 14

BIBLIOGRAPHIES
GUIDED MISSILES
QUARTERLY BIBLIOGRAPHY OF REPORTS PREPARED UNDER CONTRACT NO. AF 04(695)-269,
AD-600 083 DIV. 12

BIBLIOGRAPHIES
INFORMATION RETRIEVAL
INFORMATION SCIENCE -GENERAL DISCUSSION AND BIBLIOGRAPHY,
AD-600 110 DIV. 30

BIBLIOGRAPHIES
MATERIAL FORMING
RESEARCH ON U. S. GOVERNMENT METALWORKING PROCESSES AND EQUIPMENT WITH EMPHASIS ON REFRACTORY METALS, BERYLLIUM, SUPERALLOYS, AND HIGH-STRENGTH STEELS,
AD-600 088 DIV. 17

BIBLIOGRAPHIES
METALS
DEFENSE METALS INFORMATION CENTER SELECTED ACCESSIONS ON HIGH-STRENGTH ALLOYS, LIGHT METALS, NONMETALLICS, REFRACTORY METALS -MAY 1964,
AD-600 803 DIV. 17

BIBLIOGRAPHIES
NEUTRON FLUX
NEUTRON FLUX MEASUREMENTS ANNOTATED BIBLIOGRAPHY,
AD-600 707 DIV. 20

BIBLIOGRAPHIES
OPTICAL EQUIPMENT
OPTICAL IMAGE CONVERTERS: AN ANNOTATED BIBLIOGRAPHY, 1961-1963,
AD-600 095 DIV. 8

BIBLIOGRAPHIES
PASTEURELLA TULARENSIS
TULAREMIA IN THE SOVIET UNION--AN ANNOTATED BIBLIOGRAPHY CONTAINING 293 REFERENCES,
AD-600 573 DIV. 14

BIBLIOGRAPHIES
PRESERVATION
BIBLIOGRAPHY ON PRESERVATION OF INACTIVE EQUIPMENT AND LONG-TERM STORAGE OF MATERIALS,
AD-600 642 DIV. 18

BIBLIOGRAPHIES
SCIENTIFIC RESEARCH
BIBLIOGRAPHY OF PROFESSIONAL PAPERS CLEARED FOR POSSIBLE PUBLICATION AND/OR PRESENTATION FROM AEROSPACE CORPORATION,
AD-600 728 DIV. 32

BIBLIOGRAPHIES
SPACECRAFT
QUARTERLY BIBLIOGRAPHY OF REPORTS PREPARED UNDER CONTRACT NO. AF 04(695)-269,
AD-600 083 DIV. 12

BINARY ARITHMETIC
SEQUENCES
THE SHIFT AND ADD PROPERTY OF MAXIMAL LENGTH BINARY SEQUENCES USING CYCLOTOMIC POLYNOMALS,
AD-600 521 DIV. 8

BINOMIALS
THEOREMS
SUMMATIONS INVOLVING BINOMIAL COEFFICIENTS AND THEIR RELATION TO DYSON'S CONJECTURE,
AD-600 444 DIV. 15

BIOLOGICAL ASSAY
RADIOPROTECTIVE AGENTS
TEST METHODS USED IN DETERMINING THE RADIOPROTECTIVE POTENCY OF 701 CODED COMPOUNDS,
AD-600 228 DIV. 14
TESTING OF ANTIRADIATION AGENTS IN MONKEYS, AS AMENDED,
AD-600 229 DIV. 14

BIONICS
EAR
RESEARCH AND INVESTIGATION ON THE TRANSMISSION LINE ANALOG OF SOME FUNCTIONS OF THE COCHLEA,
AD-600 742 DIV. 30

BIONICS
HEART
ELECTRONIC DEVICE FOR SIMULATING THE ELECTRICAL ACTIVITY OF THE HEART,
AD-600 580 DIV. 14

BIONICS
SIMULATORS
MODEL USED TO DEMONSTRATE THE FUNCTIONAL STRUCTURE OF A LEARNING MACHINE OR A PATTERN RECOGNITION SYSTEM,
AD-600 079 DIV. 30

BIOPHYSICS
CELLS (BIOLOGY)
GENERAL ELECTROPHYSIOLOGY,
AD-600 133 DIV. 14

BLAST
SHOCK WAVES
CONTINUUM RADIATION BEHIND A BLAST WAVE,
AD-600 217 DIV. 9

BLEACHING AGENTS
HYDROGEN PEROXIDE
TWO-STAGE NONCHLORINATION BLEACHING OF SEVERAL HARDWOOD NEUTRAL SULFITE SEMICHEMICAL PULPS,
AD-600 851 DIV. 4

BLEACHING AGENTS
HYPOCHLORITES
TWO-STAGE NONCHLORINATION BLEACHING OF SEVERAL HARDWOOD NEUTRAL SULFITE SEMICHEMICAL PULPS,
AD-600 851 DIV. 4

BLOOD CIRCULATION
AUTONOMIC NERVOUS SYSTEM
EFFECTS OF STIMULATION OF VASADILATOR CENTERS OF HYPOTHALAMUS ON THE BLOOD FLOW IN THE FEMORAL ARTERIES OF DOGS,
AD-600 380 DIV. 14

BLOOD CIRCULATION
BRAIN
METHOD OF CONTINUOUS REGISTRATION OF LOCAL CEREBRAL BLOOD FLOW IN ACUTE AND CHRONIC EXPERIMENTS,
AD-600 828 DIV. 14

BLOOD CIRCULATION
HYPOTHERMIA
VASCULAR RESPONSES DURING HYPOTHERMIA,
AD-600 349 DIV. 14

BLOOD PLASMA
SHOCK (PATHOLOGY)
THERAPEUTIC PROPERTIES OF BLOOD PLASMA IN THE THERAPY OF TOURNIQUET SHOCK,
AD-600 240 DIV. 14

BLUNT BODIES
HEAT TRANSFER
EFFECT OF ANGLE ATTACK ON LAMINAR CONNECTIVE HEAT TRANSFER ON SHARP AND BLUNT CONES,
AD-600 628 DIV. 9

BLUNT BODIES
HYPERSONIC FLOW
ASYMPTOTIC FLOW PATTERN OF A HYPERSONIC BODY,
AD-600 540 DIV. 9

BODIES OF REVOLUTION
ANGLE OF ATTACK
CIRCUMFERENTIAL PRESSURE DISTRIBUTION ON AN INCLINED BODY OF REVOLUTION,
AD-600 138 DIV. 9

BODY FLUIDS
VOLUME
VOLUME CONDITIONED STIMULI AFFECTING SALT AND WATER EXCRETION,
AD-600 342 DIV. 14

BOILERS
MARINE SURFACE PROPULSION
COMBUSTION ENGINEERING, INCORPORATED SINGLE FURNACE NATURAL CIRCULATION BOILER FOR DDG-15 CLASS, PERFORMANCE AND GENERAL SUITABILITY TEST,
AD-600 831 DIV. 27

BONE
RADIATION EFFECTS
EFFECT OF NEUTRON EXPOSURE ON BONE GROWTH IN RATS,
AD-600 171 DIV. 14

COSMIC RAYS
INTENSITY
COSMIC RAY INTENSITY VARIATIONS DURING 1963,
AD-600 369 DIV. 2

COSMIC RAYS
STORMS
SPECTRAL VARIATIONS DURING COSMIC RAY STORMS IN THE INTERNATIONAL GEOPHYSICAL YEAR,
AD-600 367 DIV. 2

COUETTE FLOW
TWO-DIMENSIONAL FLOW
APPLICATION OF SINGULAR INTEGRAL-EQUATION THEORY TO A LINEARIZED PROBLEM IN COUETTE FLOW,
AD-600 832 DIV. 9

CREOSOTE
PRESERVATION
ANALYSIS OF THE WOOD PRESERVATIVES, CREOSOTE AND COAL TAR, IN TEST PANELS EXPOSED TO A MARINE ENVIRONMENT,
AD-600 365 DIV. 14

CRUCIFORM WINGS
COMPRESSIBLE FLOW
CRUCIFORM WING OF A FINITE SPAN IN A COMPRESSIBLE FLOW,
AD-600 502 DIV. 9

CRYOGENICS
HELIUM
ELECTRON INTERACTIONS IN CRYOGENIC HELIUM PLASMAS,
AD-600 043 DIV. 25

CRYOGENICS
THERMAL CONDUCTIVITY
THERMAL CONDUCTIVITY OF COPPER-NICKEL ALLOYS AT 4.2 K,
AD-600 487 DIV. 17

CRYOPUMPING
GASES
TEMPERATURE EFFECTS ON THE CAPTURE COEFFICIENTS OF N, A, CO, N2O, O AND CO2,
AD-600 196 DIV. 30

CRYSTAL FILTERS
VERY HIGH FREQUENCY
RESEARCH INTO NEW APPROACHES FOR VHF FILTER CRYSTALS,
AD-600 118 DIV. 8

CRYSTAL GROWTH
FERRITES
ON THE PREPARATION OF SINGLE CRYSTAL FERRITE MATERIALS BY THE FLOATING ZONE TECHNIQUE,
AD-600 062 DIV. 25

CRYSTAL LATTICE DEFECTS
COLOR CENTERS
F CENTER ENERGY LEVELS OF ALKALINE EARTH CATIONS IN ALKALI METAL HALIDE CRYSTALS,
AD-600 617 DIV. 25

CRYSTAL LATTICE DEFECTS
EQUATIONS
LOCALIZED MODES OF VIBRATIONS IN IONIC CRYSTALS WITH AN ISOTOPIC DEFECT,
AD-600 492 DIV. 25

CRYSTAL LATTICE DEFECTS
GRAIN BOUNDARIES
ELECTRICAL CHARACTERISTICS OF GRAIN BOUNDARIES IN COMPOUND SEMICONDUCTORS,
AD-600 321 DIV. 25

CRYSTAL LATTICES
PARAMAGNETIC RESONANCE
PARAMAGNETIC RELAXATION OF FIXED CENTERS IN CRYSTALS,
AD-600 131 DIV. 25

CRYSTAL OSCILLATORS
QUARTZ
FREQUENCY TEMPERATURE COMPENSATION TECHNIQUES FOR QUARTZ CRYSTAL OSCILLATORS,
AD-600 807 DIV. 8

CRYSTAL STRUCTURE
SURFACES
EQUILIBRIUM AND KINETIC MORPHOLOGY AND STRUCTURE OF SOLID SURFACES,
AD-600 729 DIV. 25

CRYSTALS
EQUATIONS OF STATE
EQUATIONS OF STATE FOR SOLID BODIES (METALS AND IONIC, VALENT, AND MOLECULAR CRYSTALS),
AD-600 614 DIV. 25

CRYSTALS
MAGNETIC PROPERTIES
PARAMAGNETIC RELAXATION IN CRYSTALS,
AD-600 089 DIV. 25

CRYSTALS
OPTICAL PROPERTIES
LAYER-LIKE FIELD INHOMOGENEITIES IN PHOTOCONDUCTORS
IN THE PRE-BREAKDOWN RANGE,
AD-600 830 DIV. 25

CRYSTALS
VIBRATION
LOCALIZED MODES OF VIBRATIONS IN IONIC CRYSTALS WITH AN ISOTOPIC DEFECT,
AD-600 492 DIV. 25

CUMULONIMBUS CLOUDS
TROPOPAUSE
TROPOPAUSE PENETRATIONS BY CUMULONIMBUS CLOUDS,
AD-600 819 DIV. 2

CUMULUS CLOUDS
MATHEMATICAL MODELS
SIMPLIFIED MODEL FOR THE FORMATION, MOVEMENT, AND DISSIPATION OF FAIR WEATHER CUMULUS CLOUDS,
AD-600 835 DIV. 2

CURRENT AMPLIFIERS
VOLTAGE
EVALUATION OF DIFFERENTIAL AMPLIFIER CIRCUITS USED IN ELECTROPHYSIOLOGICAL RESEARCH,
AD-600 124 DIV. 16

CUTTING TOOLS
TIME STUDIES
NOPP STANDARD TIME FORMULA S-1 REPORT FOR OPERATING POWER SHEARS,
AD-600 204 DIV. 44

CYBERNETICS
DIAGNOSIS
MEDICAL DIAGNOSIS USING THE URAL-2 COMPUTER,
AD-600 503 DIV. 16

CYBERNETICS
NEUROLOGY
NEUROCYBERNETICS CONFERENCE AT ROSTOV STATE UNIVERSITY IN USSR,
AD-600 624 DIV. 16

CYBERNETICS
SOUND
RESEARCH AND INVESTIGATION ON THE TRANSMISSION LINE ANALOG OF SOME FUNCTIONS OF THE COCHLEA,
AD-600 742 DIV. 30

CYCLOTRON WAVES
MICROWAVE AMPLIFIERS
EXPERIMENTAL AND ANALYTICAL EVALUATION OF THE HIGH-EFFICIENCY CAPABILITIES OF THE CYCLOTRON-SYNCHRONOUS WAVE AMPLIFIERS,
AD-600 559 DIV. 8

CYLINDRICAL BODIES
STRUCTURAL SHELLS
LARGE DISPLACEMENT ANALYSIS OF BUCKLING OF AXIALLY COMPRESSED CIRCULAR CYLINDRICAL SHELLS,
AD-600 659 DIV. 25

DATA PROCESSING SYSTEMS
COMMUNICATION THEORY
SOME PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION,
AD-600 047 DIV. 30
PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION,
AD-600 113 DIV. 30

DATA PROCESSING SYSTEMS
COMPUTERS
METEOROLOGICAL PRODUCTS FROM DIGITIZED SATELLITE VIDICON CLOUD PICTURES,
AD-600 078 DIV. 2

DATA PROCESSING SYSTEMS
DIGITAL COMPUTERS
CRITERION FOR CHOOSING THE GRID SIZE USED WHEN PLANAR CONTOUR CURVES ARE ENCODED IN DIGITAL FORM,
AD-600 310 DIV. 30
DATA SYSTEMS; DIGITAL COMPUTERS, COMPUTER COMPONENTS, COMPILERS AND INFORMATION STORAGE AND RETRIEVAL,
AD-600 838 DIV. 30

DATA PROCESSING SYSTEMS
GUIDED MISSILES
JOINT AFMTC/RANGE USER DATA CONFERENCE (5TH),
AD-600 091 DIV. 12

DATA PROCESSING SYSTEMS
MILITARY REQUIREMENTS
DESIGN AND DEVELOPMENT OF A MODULAR DIGITAL COMPUTER SYSTEM TO BE USED IN FUTURE ARMY COMMAND CONTROL INFORMATION SYSTEMS,
AD-600 284 DIV. 30

DATA PROCESSING SYSTEMS
PATTERN RECOGNITION
STUDY AND EXPERIMENTAL INVESTIGATION OF PATTERN RECOGNITION SYSTEMS SUITABLE FOR GRAPHICAL DATA PROCESSING,
AD-600 331 DIV. 30

DATA STORAGE SYSTEMS
CIRCUITS
DEVELOPMENT OF AN INTERMEDIATE CAPACITY, HIGH-SPEED MAGNETIC FILM MEMORY SYSTEM,
AD-600 271 DIV. 30

DATA STORAGE SYSTEMS
COMMUNICATION THEORY
PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION,
AD-600 113 DIV. 30

DATA STORAGE SYSTEMS
MAGNETIC RECORDING SYSTEMS
DEVELOPMENT OF AN INTERMEDIATE CAPACITY, HIGH-SPEED MAGNETIC FILM MEMORY SYSTEM,
AD-600 271 DIV. 30

DATA TRANSMISSION SYSTEMS
GEOMETRIC FORMS
CRITERION FOR CHOOSING THE GRID SIZE USED WHEN PLANAR CONTOUR CURVES ARE ENCODED IN DIGITAL FORM,
AD-600 310 DIV. 30

DATA TRANSMISSION SYSTEMS
INFORMATION RETRIEVAL
PROPOSED BASIC CONFIGURATION FOR A NATIONAL SYSTEM OF INTERLINKING INFORMATION RETRIEVAL NETWORKS MODEL NETWORK,
AD-600 221 DIV. 32

DATA TRANSMISSION SYSTEMS
TELEMETER SYSTEMS
METHODS AND RESULTS OF TESTING A PCM/FS TELEMETRY SYSTEM UNDER SIMULATED ADVERSE CONDITIONS,
AD-600 633 DIV. 8

DECELERATION
ABLATION
DECELERATION AND MASS CHANGE OF AN ABLATING BODY DURING HIGH-VELOCITY MOTION,
AD-600 692 DIV. 9

DECISION MAKING
DIGITAL COMPUTERS
OPTIMAL STRATEGIES AND HUMAN BEHAVIOR IN 'FUNGUS-EATER GAME 4,
AD-600 823 DIV. 28

DECISION MAKING
GROUP DYNAMICS
DECISION-MAKING AND COMMUNICATION PATTERNS UNDER STRESS AND OVERLOAD WHEN THE PARTICIPANTS FUNCTION AS A SELF-ORGANIZING SYSTEM,
AD-600 181 DIV. 28

DECISION MAKING
PROBABILITY
BASES FOR PREFERENCES AMONG THREE-OUTCOME BETS,
AD-600 139 DIV. 28
MICROSTRUCTURE OF GUESS PROCESSES,
AD-600 474 DIV. 16

DECISION THEORY
TABLES
CONVERSION OF LIMITED-ENTRY DECISION TABLES TO COMPUTER PROGRAMS,
AD-600 412 DIV. 30

DECODING
ERRORS
CUMULATIVE CODES AS VARIABLE REDUNDANCY CODES,
AD-600 009 DIV. 30

DETECTION
DATA PROCESSING SYSTEMS
INFORMATION SYSTEM FOR IDENTIFICATION AND RAID RECOGNITION IN AIR/SPACE DEFENSE,
AD-600 538 DIV. 6

DETECTORS
AMPLIFIERS
X-BAND SOLID-STATE DETECTOR/AMPLIFIER,
AD-600 279 DIV. 8

DETECTORS
PHOTOTUBES
OPTIMIZED COHERENT OPTICAL RECEIVER TECHNIQUES,
AD-600 018 DIV. 8

DETONATIONS
VELOCITY
STEADY DETONATIONS IN GASEOUS OZONE,
AD-600 452 DIV. 25

DEUTERON BOMBARDMENT
HELIUM
REACTION OF HE3 WITH DEUTERONS,
AD-600 408 DIV. 20

STUDIES OF VORTEX CLOUD PATTERNS,
AD-600 069 DIV. 2

CNS DEPRESSANTS
CENTRAL NERVOUS SYSTEM
RESEARCH ON DRUGS ON NEURONAL TRANSMISSION,
AD-600 227 DIV. 14

COATINGS
OXIDATION INHIBITION
OXIDATION-RESISTANT GRAPHITE BASE COMPOSITES,
AD-600 340 DIV. 14

COAXIAL CABLES
WAVEGUIDE COUPLERS
BROADBAND, HIGH-TEMPERATURE, RADIATION-RESISTANT COAXIAL CONNECTORS,
AD-600 231 DIV. 8

COBALT
METALLURGY
EFFECT OF VARYING COBALT CONTENT FROM 0 TO 8 PERCENT ON THE STRENGTH AND TOUGHNESS OF 5NI-1.5CR-0.5MO STEELS CONTAINING EITHER 0.18 OR 0.25 PERCENT CARBON,
AD-600 790 DIV. 17

CODING
COMMUNICATION THEORY
COMMUNICATION THEORY GROUP,
AD-600 048 DIV. 8

CODING
SEQUENCES
METHODS OF CODING IN WHICH THE PRINCIPLES OF TIME CONVERSION AND SEQUENTIAL BINARY WEIGHING ARE COMBINED-CONVERTING VOLTAGES INTO BINARY CODES,
AD-600 587 DIV. 30

COINCIDENCE COUNTING
RADIATION MEASUREMENT SYSTEMS
DESIGN OF AN AUTOMATED FAST COINCIDENCE NUCLEAR RADIATION SPECTROMETER,
AD-600 143 DIV. 20

COLD ENVIRONMENT
OXYGEN CONSUMPTION
EFFECTS OF OXYGEN INHALATION ON RESPONSES TO COLD EXPOSURE,
AD-600 077 DIV. 14

COLOR CENTERS
ATOMIC ENERGY LEVELS
Z CENTER ENERGY LEVELS OF ALKALINE EARTH CATIONS IN ALKALI METAL HALIDE CRYSTALS,
AD-600 617 DIV. 25

COMBINATORIAL ANALYSIS
APPLICATIONS OF THE CALCULUS FOR FACTORIAL ARRANGEMENTS III. UNEQUAL NUMBERS IN THE ANALYSIS OF VARIANCE,
AD-600 731 DIV. 15

COMMAND + CONTROL SYSTEMS
SIMULATION
AERO-SPACE ENVIRONMENT SIMULATION SYSTEM (ASESS). VOLUME I. MASTER CONTROL PROGRAM AND PRESENTLY INCLUDED SUB-ROUTINES,
AD-600 186 DIV. 9

COMMERCE
PRODUCTION
AMERICAN ECONOMIC SYSTEM AND ITS RELATION TO SCIENCE, TECHNOLOGICAL PRODUCTION, AND PUBLIC POLICY,
AD-600 274 DIV. 32

COMMUNICATION SYSTEMS
DESIGN
HIGH GAIN ANTENNA REALIZATION AND TRACKING STUDY, UTILIZING PHASED ARRAY PARABOLIC ANTENNAS,
AD-600 651 DIV. 8

COMMUNICATION SYSTEMS
EFFECTIVENESS
DESIGN, DEVELOPMENT, HARDWARE FABRICATION AND TESTING OF THE COMMUNICATION SYSTEM AN/USC-31(V) PREPRODUCTION MODELS,
AD-600 252 DIV. 5
METHODS AND RESULTS OF TESTING A PCM/PS TELEMETRY SYSTEM UNDER SIMULATED ADVERSE CONDITIONS,
AD-600 633 DIV. 8

COMMUNICATION SYSTEMS
SITE SELECTION
DETERMINING THE SITE OF TRANSMITTERS FOR USW AND MICROWAVE RADIO COMMUNICATIONS WITH THE AID OF A TERRAIN MODEL,
AD-600 615 DIV. 8

COMMUNICATION THEORY
DATA PROCESSING SYSTEMS
SOME PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION,
AD-600 047 DIV. 30

COMMUNICATION THEORY
DEFENSE SYSTEMS
INFORMATION SYSTEM FOR IDENTIFICATION AND RAID RECOGNITION IN AIR/SPACE DEFENSE,
AD-600 538 DIV. 6

COMMUNICATION THEORY
PLASMA SHEATH
INFORMATION TRANSFER FUNCTIONS THROUGH THE PLASMA SHEATH OF A RE-ENTRY VEHICLE,
AD-600 821 DIV. 8

COMMUNICATION THEORY
SIGNALS
COMMUNICATION THEORY GROUP,
AD-600 048 DIV. 8
EFFECT OF SIGNAL SHAPE ON ITS DETECTION UNDER NORMAL CORRELATED NOISE,
AD-600 604 DIV. 8

COMPILERS
COMPUTER LOGIC
EVALUATING THE LOGICAL DESIGN OF THE PROBLEM ORIENTED SYMBOL PROCESSOR, ADAM MICROPROGRAM DECKS AND 7094 INTERPRETIVE PROGRAM ASSEMBLIES,
AD-600 014 DIV. 30

COMPILERS
DIGITAL COMPUTERS
A COMPLETE FLOATING DECIMAL INTERPRETIVE SYSTEM FOR THE LGP-30 ROYAL MCBEE DIGITAL COMPUTER,
AD-600 027 DIV. 30

COMPILERS
PROGRAMMING LANGUAGES
SABER (SYMBOLIC ASSEMBLY ROUTINE FOR THE CDC 1604-1604A COMPUTER),
AD-600 242 DIV. 30
STUDIES IN THE FIELD OF COORDINATION CHAIN POLYMERS VII. COORDINATION POLYMERS BASED ON QUINIZARIN AND 4, 4'-BIS-(ACETOACETYL)-DIPHENYL ETHER,
AD-600 085 DIV. 4

COMPRESSIBLE FLOW
CRUCIFORM WINGS
CRUCIFORM WING OF A FINITE SPAN IN A COMPRESSIBLE FLOW,
AD-600 502 DIV. 9

COMPRESSORS
PERFORMANCE (ENGINEERING)
SPECIAL TEST EVALUATION REPORTS FOR AMERICAN AIR FILTER ECP 90 INVESTIGATION ST -101,
AD-600 866 DIV. 13

COMPUTER LOGIC
DIGITAL COMPUTERS
EVALUATING THE LOGICAL DESIGN OF THE PROBLEM ORIENTED SYMBOL PROCESSOR,
AD-600 013 DIV. 30

COMPUTER LOGIC
MALFUNCTIONS
PROBLEMS OF FAULT DIAGNOSIS OF COMPUTER MICROCIRCUITRY BY USE OF BOOLEAN FUNCTION,
AD-600 547 DIV. 8

CONCRETE
NEUTRON SCATTERING
SEMIEMPIRICAL FORMULA FOR DIFFERENTIAL DOSE ALBEDO FOR NEUTRONS ON CONCRETE,
AD-600 684 DIV. 20

CONCRETE
SALT SPRAY TESTS
EVALUATION OF 4 PAINTS AFTER EXPOSURE TO ENVIRONMENTS,
AD-600 357 DIV. 13

CONDITIONED REFLEX
REASONING
ANALYSIS OF MENTAL MECHANISMS OF THE CONDITIONED REFLEX AND THE THOUGHT PROCESSES IN THE HUMAN BRAIN,
AD-600 585 DIV. 28

CONFINEMENT (PSYCHOLOGY)
SHELTERS
PSYCHOLOGICAL EFFECTS OF SHELTER OCCUPANCY,
AD-600 064 DIV. 28

CONICAL ANTENNAS
DESIGN
FERRITE-FILLED RECTANGULAR SLOT AND LOG CONICAL SPIRAL UHF-VHF ANTENNAS,
AD-600 557 DIV. 8

CONICAL ANTENNAS
WAVE TRANSMISSION
RECEPTION AND TRANSMISSION OF TRANSIENT ELECTROMAGNETIC FIELDS,
AD-600 535 DIV. 25

CONTAINERS
DEGRADATION
PACKAGING OF ELECTRONIC EQUIPMENT FOR TRANSPORTATION IN VIBRATION ENVIRONMENTS WITH EMPHASIS ON SEAGOING VEHICLES,
AD-600 530 DIV. 8

CONTINUUM MECHANICS
DIELECTRICS
THEORY OF CONTINUOUS MEDIA APPLIED TO POLAR ELASTIC DIELECTRICS SUBJECT TO LARGE DEFORMATIONS AND ELECTROMAGNETIC FIELDS,
AD-600 329 DIV. 25

CONTROL SEQUENCES
DIGITAL COMPUTERS
AERO-SPACE ENVIRONMENT SIMULATION SYSTEM (ASESS). VOLUME I. MASTER CONTROL PROGRAM AND PRESENTLY INCLUDED SUB-ROUTINES,
AD-600 186 DIV. 9

CONTROL SYSTEMS
LINEAR SYSTEMS
THE REPRESENTATION PROBLEM FOR A GENERAL LINEAR DYNAMIC SYSTEM,
AD-600 035 DIV. 15
TIME-OPTIMAL CONTROL OF DISCRETE SYSTEMS SUBJECT TO INPUT SATURATION,
AD-600 289 DIV. 30

CONTROLLED ATMOSPHERES
STORAGE
DETERIORATION OF MATERIALS IN STORAGE AND RECOMMENDED STORAGE CONDITIONS,
AD-600 560 DIV. 14

CONTROLLED ATMOSPHERES
SURGICAL TECHNIQUES
DESCRIPTION OF CONSTRUCTION, INSTALLATION, AND MAINTENANCE OF A GERM-FREE OPERATING ROOM,
AD-600 721 DIV. 16

CONVEX SETS
CONVEXITY IN THE THEORY OF CHOICE UNDER RISK,
AD-600 553 DIV. 15

COOLING + VENTILATING EQUIPMENT
STRUCTURES
DEVELOPMENT AND TEST OF A LABORATORY SYSTEM FOR SIMULATION OF AERODYNAMIC AND RADIATIVE COOLING OF STRUCTURES,
AD-600 155 DIV. 9

COPPER ALLOYS
THERMAL CONDUCTIVITY
THERMAL CONDUCTIVITY OF COPPER-NICKEL ALLOYS AT 4.2 K,
AD-600 457 DIV. 17

COPPER COATINGS
EFFECTIVENESS
EMI-SHIELDING EFFECTIVENESS OF COPPER-SPRAYED ENCLOSURES,
AD-600 031 DIV. 13

CORIOLIS EFFECT
CONVECTION
INFLUENCE OF CORIOLIS FORCES ON ONSET OF THERMAL CONVECTION,
AD-600 590 DIV. 9

CORRELATION TECHNIQUES
PATTERN RECOGNITION
STUDY OF THE CHAIN-DIFFERENCE CORRELATION TECHNIQUE FOR CONTOUR LINE PATTERNS,
AD-600 276 DIV. 30

CORROSION INHIBITION
ALLOYS
CORROSION AND PROTECTION OF METAL STRUCTURAL MATERIALS AND ALLOYS -COLLECTION OF ARTICLES,
AD-600 784 DIV. 17

CORROSION INHIBITION
BIBLIOGRAPHIES
BIBLIOGRAPHY ON VAPOR PHASE CORROSION INHIBITORS FOR NONFERROUS AND FERROUS METALS,
AD-600 643 DIV. 17

CORROSION INHIBITION
METALS
BIBLIOGRAPHY ON VAPOR PHASE CORROSION INHIBITORS FOR NONFERROUS AND FERROUS METALS,
AD-600 643 DIV. 17

CORROSION INHIBITION
PLASTIC COATINGS
THE CORROSIVITY OF MAGNESIUM ALLOYS IN 5 AND 20 PERCENT SALT FOG ENVIRONMENTS,
AD-600 029 DIV. 17

CORROSION-RESISTANT ALLOYS
HARDENING
INFLUENCE OF CHEMICAL COMPOSITION ON ARTIFICIAL AGE-HARDENING AND STRESS CORROSION OF HIGH-STRENGTH ALZNMGCU ALLOYS,
AD-600 688 DIV. 17

ELASTOMERS
SILANES
SYNTHESIS OF REGULATED STRUCTURE POLYPHENYLETHER-SILOXANE BLOCK COPOLYMERS,
AD-600 121 DIV. 14

ELECTRIC ARCS
GAS FLOW
BASIC RESEARCH ON GAS FLOWS THROUGH ELECTRIC ARCS-HOT GAS CONTAINMENT LIMITS,
AD-600 798 DIV. 25

ELECTRIC CONNECTORS
PROTECTIVE COVERINGS
PRODUCTION ACCEPTANCE TESTING OF CABLE SPLICE CASES FOR MINUTEMAN INTERSITE COMMUNICATIONS SYSTEMS,
AD-600 716 DIV. 12

ELECTRIC DISCHARGES
STATIC ELECTRICITY
HIGH-PERFORMANCE ELECTROSTATIC DISCHARGES FOR HELICOPTERS,
AD-600 451 DIV. 1

ELECTRIC FIELDS
RADIATION TOLERANCES
NON-THERMAL EFFECTS OF ALTERNATING ELECTRICAL FIELDS ON BIOLOGICAL STRUCTURES,
AD-600 263 DIV. 14

ELECTRIC POWER PRODUCTION
ELECTRON BEAMS
ELECTRON BEAM PARAMETRIC CONVERTER,
AD-600 723 DIV. 8

ELECTRIC POWER PRODUCTION
MAGNETOHYDRODYNAMICS
LARGE-SIGNAL BEHAVIOR OF A PARAMETRIC MAGNETOGASDYNAMIC GENERATOR,
AD-600 004 DIV. 25

ELECTRIC POWER PRODUCTION
SOLAR PANELS
APPLIED RESEARCH PROGRAM FOR BINARY RANKINE CYCLE ENERGY CONVERSION,
AD-600 320 DIV. 7

ELECTRIC POWER PRODUCTION
SPACE PROPULSION
POWER CONVERSION AND GENERATION TECHNIQUES FOR ELECTRIC PROPULSION ENGINES,
AD-600 833 DIV. 7

ELECTRIC PROPULSION
POWER SUPPLIES
POWER CONVERSION AND GENERATION TECHNIQUES FOR ELECTRIC PROPULSION ENGINES,
AD-600 833 DIV. 7

ELECTRICAL EQUIPMENT
ICE PREVENTION
COATING MATERIAL FOR PREVENTION OF ICE AND SNOW ACCUMULATIONS; FURTHER INVESTIGATIONS,
AD-600 925 DIV. 7

ELECTRICAL NETWORKS
SYNTHESIS
TIME-DOMAIN SYNTHESIS PROBLEM IN ELECTRICAL NETWORK THEORY,
AD-600 236 DIV. 8

ELECTROCARDIOGRAPHY
CYBERNETICS
ELECTRONIC DEVICE FOR SIMULATING THE ELECTRICAL ACTIVITY OF THE HEART,
AD-600 580 DIV. 14

ELECTROCARDIOGRAPHY
HEART
ELECTRONIC INSTRUMENT FOR RECORDING ELECTROCARDIOGRAMS WHICH SHOW THE TIME INTERVALS OF THE CARDIAC CYCLE,
AD-600 123 DIV. 14

ELECTROCHEMISTRY
ELECTRODES
THE INFLUENCE OF SURFACE ROUGHNESS OF SOLID ELECTRODES ON ELECTROCHEMICAL MEASUREMENTS,
AD-600 842 DIV. 4

ELECTROCHEMISTRY
ELECTRON BEAMS
MATERIAL PROCESSING AND PHENOMENA INVESTIGATIONS FOR FUNCTIONAL ELECTRONICS BLOCKS,
AD-600 355 DIV. 8

ELECTRODES
SURFACE PROPERTIES
THE INFLUENCE OF SURFACE ROUGHNESS OF SOLID ELECTRODES ON ELECTROCHEMICAL MEASUREMENTS,
AD-600 842 DIV. 4

ELECTROLYTIC CELLS
DEVELOPMENT OF THE SEALED ZINC-SILVER OXIDE SECONDARY BATTERY SYSTEM,
AD-600 395 DIV. 7

ELECTROLYTIC CELLS
DESIGN
INVESTIGATIONS LEADING TO THE DESIGN OF A RELIABLE SEALED NICKEL-CADMIUM CELL,
AD-600 251 DIV. 7

ELECTROMAGNETIC FIELDS
ANTENNAS
RECEPTION AND TRANSMISSION OF TRANSIENT ELECTROMAGNETIC FIELDS,
AD-600 535 DIV. 25

ELECTROMAGNETIC FIELDS
STATISTICAL PROCESSES
COHERENCE THEORY,
AD-600 480 DIV. 25

ELECTROMAGNETIC FIELDS
THEORY
THEORY OF NOISE-LIKE ELECTROMAGNETIC FIELDS OF ARBITRARY SPECTRAL WIDTH,
AD-600 434 DIV. 25
COHERENCE THEORY,
AD-600 480 DIV. 25

ELECTROMAGNETIC SHIELDING
RADIO FREQUENCY INTERFERENCE
EMI-SHIELDING EFFECTIVENESS OF COPPER-SPRAYED ENCLOSURES,
AD-600 031 DIV. 19

ELECTROMAGNETIC WAVE REFLECTION
ATMOSPHERE
PARTIAL REFLECTIONS IN THE ATMOSPHERE AND LONG-DISTANCE PROPAGATION,
AD-600 683 DIV. 8

ELECTROMAGNETIC WAVE REFLECTIONS
FUNCTIONS
TABLES OF ELECTROMAGNETIC WAVE REFLECTION FUNCTIONS,
AD-600 720 DIV. 25

ELECTROMAGNETIC WAVES
DIFFRACTION
DIFFRACTION OF ELECTROMAGNETIC WAVES BY A CIRCULAR APERTURE IN AN INFINITELY CONDUCTING PLANE SCREEN,
AD-600 132 DIV. 8

ELECTROMAGNETIC WAVES
EQUATIONS
COHERENCE THEORY,
AD-600 480 DIV. 25

ELECTROMAGNETIC WAVES
GENERATORS
INDUCED GAMMA-RAY EMISSION FEASIBILITY STUDY OF ELECTROMAGNETIC WAVE GENERATORS,
AD-600 270 DIV. 20

ELECTROMAGNETIC WAVES
MONITORS
ELECTROMAGNETIC MEASUREMENTS DURING THE BANSMER SERIES,
AD-600 665 DIV. 22
TATARSKIAN CORRELATION FUNCTION FOR ARBITRARY TURBULENCE CONDITIONS,
AD-600 443 DIV. 8
PROPAGATION OF ELECTROMAGNETIC WAVES IN SINUSOIDALLY STRATIFIED DIELECTRIC MEDIA,
AD-600 711 DIV. 8
PROPAGATION OF ELECTROMAGNETIC WAVES IN SINUSOIDALLY STRATIFIED DIELECTRIC MEDIA,
AD-600 713 DIV. 8

ELECTROMAGNETIC WAVES
SCATTERING
EFFECT OF SMALL IRREGULARITIES ON ELECTROMAGNETIC SCATTERING FROM AN INTERFACE OF ARBITRARY SHAPE,
AD-600 543 DIV. 8

ELECTRON BEAMS
ELECTROMAGNETIC FIELDS
ELECTRON BEAM PARAMETRIC CONVERTER,
AD-600 723 DIV. 8

ELECTRON GUNS
DESIGN
OPTIMIZED COHERENT OPTICAL RECEIVER TECHNIQUES,
AD-600 018 DIV. 8
DESIGN CRITERIA FOR A LOW-NOISE, CROSS-FIELD ELECTRON GUN AMPLIFIER,
AD-600 570 DIV. 8

ELECTRON GUNS
ELECTRON TUBE PARTS
HIGH-POWER 100300 MC CRESTATRONS,
AD-600 595 DIV. 8

ELECTRON TUBE PARTS
RELIABILITY (ELECTRONICS)
FAILURE MECHANISMS IN TRAVELING WAVE TUBES,
AD-600 522 DIV. 8

ELECTRON TUBES
INDUSTRIAL PRODUCTION
PRODUCTION ENGINEERING MEASURE FOR TUBE TYPE 7587,
AD-600 007 DIV. 9

ELECTRON TUBES
PRODUCTION
DEVELOPMENT OF AN IMPROVED JAN 6299,
AD-600 163 DIV. 8

ELECTRON TUBES
VERY HIGH FREQUENCY
HIGH-POWER 100300 MC CRESTATRONS,
AD-600 595 DIV. 8

ELECTRONIC EQUIPMENT
PACKAGING
PACKAGING OF ELECTRONIC EQUIPMENT FOR TRANSPORTATION IN VIBRATION ENVIRONMENTS WITH EMPHASIS ON SEAGOING VEHICLES,
AD-600 330 DIV. 8
STUDY TO REDUCE AND COMPILE USAF NAP RADIATION EFFECTS DATA,
AD-600 054 DIV. 20

ELECTRONIC SWITCHES
BROADBAND
BROADBAND, SOLID STATE, HIGH POWER SWITCHES COVERING THE RANGE FROM 1 KMC TO 11 KMC,
AD-600 290 DIV. 8

ELECTRONIC SWITCHES
RADIOFREQUENCY
RADIOFREQUENCY DESENSITIZED SILICON PNPN SWITCH DESIGNED FOR USE IN WEAPONS CIRCUITRY,
AD-600 336 DIV. 8

ELECTRONIC SWITCHES
SEMICONDUCTOR DEVICES
SEMICONDUCTOR SWITCHING AND LIMITING USING 3 DB SHORT SLOT (HYBRID) COUPLERS,
AD-600 028 DIV. 8

ELECTRONIC SWITCHES
SEMICONDUCTORS
HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) AND HIGH SPEED SEMICONDUCTOR SWITCH (GATE),
AD-600 060 DIV. 26

ELECTRONICS
BIBLIOGRAPHIES
JOINT SERVICE ELECTRONICS PROGRAM,
AD-600 049 DIV. 8

ELECTROPHOTOGRAPHY
MAPPING
EVALUATION AND TEST OF A SINGLE COLOR ELECTROSTATIC PRINTING MACHINE FOR THE REPRODUCTION OF TOPOGRAPHIC MAPS AND CHARTS,
AD-600 241 DIV. 2

ELECTROPLATING
TIME STUDIES
NoPP STANDARD TIME FORMULA FOR ANODIZE OPERATION TIME STUDIES,
AD-600 190 DIV. 26

ELECTROSTATIC GENERATORS
POWER EQUIPMENT
ELECTROSTATIC POWER GENERATOR,
AD-600 119 DIV. 7

ELECTROTHERAPY
ANESTHESIA
APPARATUS FOR ELECTRONARCOSIS,
AD-600 147 DIV. 14

ELLIPTICAL ORBIT TRAJECTORIES
ERRORS
ERROR DERIVATIVES FOR ELLIPTIC ORBITS,
AD-600 458 DIV. 13

EMOTIONS
REASONING
RELATION OF CHANGES IN THE HEART RATE TO MENTAL WORK AND EMOTIONS,
AD-600 554 DIV. 14

ENERGY
CHEMICAL REACTIONS
MECHANOCHEMISTRY OF COUPLED CONTRACTILE AND CHEMICAL RATE PROCESSES,
AD-600 541 DIV. 4

ENERGY CONVERSION
BIOPHYSICS
MECHANOCHEMISTRY OF COUPLED CONTRACTILE AND CHEMICAL RATE PROCESSES,
AD-600 541 DIV. 4

ENERGY CONVERSION
POWER SUPPLIES
POSSIBLE FUTURE ENERGY SOURCES,
AD-600 810 DIV. 30

ENERGY CONVERSION
RANKINE CYCLE
APPLIED RESEARCH PROGRAM FOR BINARY RANKINE CYCLE ENERGY CONVERSION,
AD-600 320 DIV. 7

ENGINE STARTERS
COLD WEATHER TESTS
DEVELOPMENT AND TESTING OF AN ENGINE-MOUNTED KIT TO FACILITATE STARTING AND OPERATING LIQUID-COOLED ENGINES AT LOW TEMPERATURES,
AD-600 440 DIV. 27

ENGINEERING
MANUFACTURING METHODS
VALUE ENGINEERING AND

DIAGNOSIS
COMPUTERS
MEDICAL DIAGNOSIS USING THE URAL-2 COMPUTER,
AD-600 503 DIV. 14

DIAGNOSTIC AGENTS
AMINO ACIDS
QUICK METHOD TO DETERMINE TOTAL ALPHA-AMINO NITROGEN IN URINE AND BLOOD .
SERUM,
AD-600 808 DIV. 14

DIELECTRIC FILMS
CAPACITORS
DIELECTRIC THIN FILMS WITH INCREASED BREAKDOWN STRENGTH USED IN CAPACITORS,
AD-600 316 DIV. 8

DIELECTRICS
CAPACITORS
DIELECTRIC THIN FILMS WITH INCREASED BREAKDOWN STRENGTH USED IN CAPACITORS,
AD-600 316 DIV. 8

DIELECTRICS
CONTINUUM MECHANICS
THEORY OF CONTINUOUS MEDIA APPLIED TO POLAR ELASTIC DIELECTRICS SUBJECT TO LARGE DEFORMATIONS AND ELECTROMAGNETIC FIELDS,
AD-600 329 DIV. 25

DIELECTRICS
FILMS
DEVELOPMENT OF THIN ORGANIC ROLLED FILM CAPACITOR,
AD-600 317 DIV. 8

DIELECTRICS
MATERIALS
BROADBAND, HIGHTEMPERATURE, RADIATION-RESISTANT COAXIAL CONNECTORS,
AD-600 231 DIV. 8

DIELECTRICS
WAVE TRANSMISSION
PROPAGATION OF ELECTROMAGNETIC WAVES IN SINUSOIDALLY STRATIFIED DIELECTRIC MEDIA,
AD-600 711 DIV. 8
PROPAGATION OF ELECTROMAGNETIC WAVES IN SINUSOIDALLY STRATIFIED DIELECTRIC MEDIA,
AD-600 715 DIV. 8

DIET
OBESITY
EFFECTS OF VARIATIONS IN COMPOSITION OF DIET ON GROWTH RATE OF RATS,
AD-600 550 DIV. 14

DIET
PH
CAUSE OF INHIBITION OF DENTAL CARIES BY ALKALINE DIET AND THE CARIOSTATIC EFFECTS OF ADDING TRACE ELEMENTS TO THE DIET,
AD-600 104 DIV. 14

DIFFERENCE EQUATIONS
MATHEMATICAL MODELS
A FUNCTIONAL DECOMPOSITION FOR LINEAR DISCRETE SYSTEMS,
AD-600 056 DIV. 15

DIFFERENTIAL EQUATIONS
MATRIX RICCATI DIFFERENTIAL EQUATIONS,
AD-600 737 DIV. 15

DIFFERENTIAL EQUATIONS
BOUNDARY VALUE PROBLEMS
PROPERTIES OF WEAK SOLUTIONS OF CERTAIN SINGULAR INTEGRODIFFERENTIAL EQUATIONS,
AD-600 337 DIV. 15

DIFFERENTIAL EQUATIONS
INTEGRATION
EQUATIONS OF SATELLITE MOTION AND ITS APPLICATION TO INVESTIGATING KEPLERIAN-LIKE MOTION,
AD-600 778 DIV. 15

DIFFERENTIAL EQUATIONS
NUMERICAL ANALYSIS
VON ZEIPEL PERTURBATION METHOD FOR FINDING AN APPROXIMATE SOLUTION TO DIFFERENTIAL EQUATIONS SUCH AS OCCUR IN NONLINEAR MECHANICS,
AD-600 413 DIV. 25

DIFFERENTIAL EQUATIONS
NUMERICAL METHODS AND PROCEDURES
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM-VI MISMATCHED SYSTEMS OF LINEAR DIFFERENTIAL EQUATIONS,
AD-600 162 DIV. 15

DIFFERENTIAL GEOMETRY
THEOREMS
THEOREM OF A. N. KOLMOGOROV CONCERNING THE CONSERVATION OF CONDITIONALLY PERIODIC MOTIONS WITH SMALL CHANGE OF THE HAMILTONIAN FUNCTION,
AD-600 136 DIV. 25

DIFFRACTION
ELECTROMAGNETIC WAVES
DIFFRACTION OF ELECTROMAGNETIC WAVES BY A CIRCULAR APERTURE IN AN INFINITELY CONDUCTING PLANE SCREEN,
AD-600 132 DIV. 8

DIFFUSION
LAMINAR BOUNDARY LAYER
LAMINAR BOUNDARY LAYER WITH HYDROGEN INJECTION INCLUDING MULTICOMPONENT DIFFUSION,
AD-600 862 DIV. 9

DIGITAL COMPUTERS
COMPUTER LOGIC
A COMPLETE FLOATING DECIMAL INTERPRETIVE SYSTEM FOR THE LGP-30 ROYAL MCBEE DIGITAL COMPUTER,
AD-600 027 DIV. 30

DIGITAL COMPUTERS
CONTROL SEQUENCES
EVALUATING THE LOGICAL DESIGN OF THE PROBLEM ORIENTED SYMBOL PROCESSOR,
AD-600 013 DIV. 30

DIGITAL COMPUTERS
DATA PROCESSING SYSTEMS
DESIGN AND DEVELOPMENT OF A MODULAR DIGITAL COMPUTER SYSTEM TO BE USED IN FUTURE ARMY COMMAND CONTROL INFORMATION SYSTEMS,
AD-600 284 DIV. 30

DIGITAL COMPUTERS
DESIGN
TIME-OPTIMAL CONTROL OF DISCRETE SYSTEMS SUBJECT TO INPUT SATURATION,
AD-600 289 DIV. 30
DATA SYSTEMS; DIGITAL COMPUTERS, COMPUTER COMPONENTS, COMPILERS AND INFORMATION STORAGE AND RETRIEVAL,
AD-600 838 DIV. 30

DIGITAL COMPUTERS
PROGRAMMING (COMPUTERS)
EVALUATING THE LOGICAL DESIGN OF THE PROBLEM ORIENTED SYMBOL PROCESSOR, ADAM MICROPROGRAM DECKS AND 7094 INTERPRETIVE PROGRAM ASSEMBLIES,
AD-600 014 DIV. 30
PRELIMINARY DIAGNOSTIC PROGRAMS FOR RW 400 COMPUTER SYSTEM,
AD-600 678 DIV. 30

DIGITAL SYSTEMS
MAPPING
OPTIMIZATION OF A DIGITAL AUTOMATIC MAP COMPILATION SYSTEM,
AD-600 117 DIV. 30

DIODES (SEMICONDUCTORS)
PARAMETRIC AMPLIFIERS
FUNDAMENTAL PRINCIPLES OF PARAMETRIC AMPLIFICATION AND A QUANTITIVE TREATMENT OF VERY HIGH Q DIODES,
AD-600 408 DIV. 8

DIODES (SEMICONDUCTOR)
BACKGROUND
MEASUREMENTS OF SILICON PHOTODIODE CHARACTERISTICS UNDER BACKGROUND RADIATION CONDITIONS,
AD-600 032 DIV. 8

DIODES (SEMICONDUCTOR)
ELECTRICAL PROPERTIES
TRANSISTOR CHARACTERIZATION AND ACTIVE NETWORK STUDIES
AD-600 001 DIV. 8

DIODES (SEMICONDUCTOR)
RADIATION MEASUREMENT SYSTEMS
RESEARCH INVESTIGATION OF P-I-N-ELECTRON JUNCTION DETECTORS,
AD-600 253 DIV. 20

DIODES (SEMICONDUCTOR)
X BAND
HIGH BURNOUT-RESISTANT X-BAND TUNNEL DIODES FOR COUNTERMEASURES EQUIPMENT,
AD-600 555 DIV. 8

DIRECTION FINDING
ERRORS
ERROR ANALYSIS OF PHASED-ARRAY DIRECTION FINDERS USING MULTIPLE BEAMS,
AD-600 429 DIV. 6

DIRECTION FINDING
SEISMIC WAVES
SEISMOLOGY; THEORY OF REGULATABLE DIRECTIONAL RECEPTION (RNP),
AD-600 801 DIV. 2

DISCRIMINATORS
DELAY LINES
PERFORMANCE OF THE BINARY DELAY-LOCK TRACKING DISCRIMINATOR AS EVALUATED FROM LABORATORY-SIMULATED ENVIRONMENTS,
AD-600 599 DIV. 6

DISEASES
KIDNEYS
STUDIES ON THE NATURE OF THE ABNORMALITIES IN SOLUTE AND WATER EXCRETION IN ACUTE TUBULAR NECROSIS AND OTHER RENAL DISEASES,
AD-600 003 DIV. 16

DISKS
AIR COOLED
CALCULATION OF THE DISTRIBUTION OF TEMPERATURE IN THE ROTARY GAS TURBINE DISK AND AN ANALYSIS OF THE ORIGINATED THERMAL STRESSES,
AD-600 304 DIV. 27

DISPLAY SYSTEMS
FLUORESCENT SCREENS
DEVELOPMENT OF PHOSPHOR SCREENS FOR HIGH RESOLUTION DISPLAY DEVICES,
AD-600 724 DIV. 8

DISPLAY SYSTEMS
MEMORY
INFORMATION ASSIMILATION FROM SYMBOLIC DISPLAYS, AMOUNT OF INFORMATION PRESENTED AND REMOVED,
AD-600 034 DIV. 28

DISTANCE-MEASURING EQUIPMENT
RANGE FINDING
SOVIET STATE-OF-THE-ART REVIEW ON OPTICAL DISTANCE-FINDER TECHNOLOGY,
AD-600 800 DIV. 2

DISTRIBUTION THEORY
ELECTRICAL NETWORKS
TIME-DOMAIN SYNTHESIS PROBLEM IN ELECTRICAL NETWORK THEORY,
AD-600 236 DIV. 8

DIURETICS
PHYSIOLOGY
QUICK METHOD TO DETERMINE TOTAL ALPHA-AMINO NITROGEN IN URINE AND BLOOD SERUM,
AD-600 808 DIV. 14

DOCUMENTATION
ECONOMICS
VALUE ENGINEERING AND THE IMPORTANCE OF ENGINEERING DOCUMENTATION: TWO LECTURES,
AD-600 394 DIV. 32

DOPPLER NAVIGATION
OPTIMIZATION
SETTLING TIME CONSTRAINT FOR OPTIMIZATION OF TRANSIENT PERFORMANCE OF A VELOCITY INERTIAL NAVIGATION SYSTEM,
AD-600 140 DIV. 19

DOSIMETERS
MATERIALS
DOSIMETERS OF IONIZING RADIATION BASED ON THE MEASUREMENT OF THERMOLUMINESCENCE OF ALUMOPHOSPHATE GLASSES ('IKS' DOSIMETERS),
AD-600 493 DIV. 20

DOSIMETERS
NEUTRON SPECTRUM
MEASUREMENT OF TISSUE DOSE CONTRIBUTION OF THERMAL, INTERMEDIATE, AND FAST NEUTRONS WITH THE SOVIET RUS-SERIES DOSIMETERS,
AD-600 135 DIV. 20

DRAWING (MACHINE PROCESSING)
METALS
APPLICATION OF ULTRASONICS TO WIRE DRAWING, EFFECTS OF ULTRASONIC ENERGY ON THE MECHANISM OF PLASTIC FLOW, RESULTING METAL STRUCTURE, AND PROPERTIES,
AD-600 706 DIV. 24

DRUGS
NEUROMUSCULAR TRANSMISSION
RESEARCH ON DRUGS ON NEURONAL TRANSMISSION,
AD-600 227 DIV. 16

DYNAMIC PROGRAMMING
FLIGHT CONTROL SYSTEMS
INVESTIGATION OF DYNAMIC PROGRAMMING METHODS FOR FLIGHT CONTROL PROBLEMS,
AD-600 230 DIV. 9

EARLY WARNING SYSTEMS
DEFENSE SYSTEMS
INFORMATION SYSTEM FOR IDENTIFICATION AND RAID RECOGNITION IN AIR/SPACE DEFENSE,
AD-600 538 DIV. 6

ECONOMICS
SCIENTIFIC RESEARCH
AMERICAN ECONOMIC SYSTEM AND ITS RELATION TO SCIENCE, TECHNOLOGICAL PRODUCTION, AND PUBLIC POLICY,
AD-600 274 DIV. 22

PROPORTIONAL COUNTING,
AD-600 172 DIV. 20
INDUSTRIAL PREPAREDNESS
MEASURE: PRODUCTION OF
5% AND 10% RESISTANCE
TOLERANCE FILM TYPE
RESISTORS WITH HIGH
STABILITY,
AD-600 783 DIV. 7

FLAMES
IONS
GAS IONIZATION IN FLAMES
AND IDENTIFICATION OF
THE NEGATIVE FLAME IONS,
AD-600 456 DIV. 25

FLASHBLINDNESS
OPTICAL FILTERS
PHOTOCHROMIC PROPERTIES
OF THE TRIPLET STATE
OF AROMATIC COMPOUNDS
AND THEIR APPLICATION
TO EYE-PROTECTIVE DEVICES,
AD-600 218 DIV. 4

FLASHBLINDNESS
SPACE MEDICINE
PHOTOSTRESS AND FLASH
BLINDNESS IN AEROSPACE
OPERATIONS,
AD-600 402 DIV. 16

FLAT PLATE MODELS
HEAT TRANSFER
HEAT TRANSFER TO FLAT
PLATE IN HIGH-TEMPERATURE
RAREFIED ULTRA-HIGH MACH
NUMBER FLOW,
AD-600 344 DIV. 9

FLEXIBLE STRUCTURES
AIRCRAFT
FLEXIBLE FLIGHT VEHICLE
TRANSFER FUNCTION FACTORS
FOR USE IN AUTOPILOT
PRELIMINARY DESIGN,
AD-600 672 DIV. 1

FLIGHT CONTROL SYSTEMS
MATHEMATICAL ANALYSIS
FLEXIBLE FLIGHT VEHICLE
TRANSFER FUNCTION FACTORS
FOR USE IN AUTOPILOT
PRELIMINARY DESIGN,
AD-600 672 DIV. 1

FLIGHT CONTROL SYSTEMS
NONLINEAR SYSTEMS
ANALYSIS OF TWO NONLINEAR
FLIGHT CONTROL SYSTEMS,
PART I. LIAPOUNOV-LURJE
APPROACH TO A SIMPLIFIED
PITCH RATE AUTOPILOT. PART
II. ANALYSIS OF A HIGH-GAIN
ADAPTIVE PITCH RATE AUTOPILOT,
AD-600 771 DIV. 1

FLIGHT CONTROL SYSTEMS
OPTIMIZATION
DESIGN OF LINEAR FLIGHT
CONTROL SYSTEMS FOR
AN X-15-TYPE AIRCRAFT
USING OPTIMAL CONTROL
THEORY,
AD-600 694 DIV. 1

FLIGHT INSTRUMENTS
ALTIMETERS
INTEGRATION OF HONEYWELL
MODEL 7182 RADAR ALTIMETER
INTO THE FAA AUTOMATIC
LANDING SYSTEM,
AD-600 827 DIV. 1

FLIGHT INSTRUMENTS
DESIGN
FLIGHT PROGRESS STRIP
LOADER TYPE II,
AD-600 409 DIV. 1

FLIGHT INSTRUMENTS
SAFETY
STUDY OF INTEGRITY, RELIABILITY,
AND ACCURACY OF AUTOMATIC
HEIGHT REPORTING SYSTEM VIA
ATC RADAR BEACON SYSTEM,
AD-600 137 DIV. 1

FLUID DYNAMIC PROPERTIES
PRESSURE
RECORDER OF PRESSURE
PULSATIONS AND THEIR
FREQUENCIES IN LIQUID
AND GAS FLOWS,
AD-600 779 DIV. 20

FLUID FLOW
CAVITATION
LINEARIZED THEORY OF TWO-DIMENSION-
AL CAVITY FLOWS,
AD-600 144 DIV. 9

FLUID FLOW
ELECTRICAL CONDUCTANCE
NON-EQUILIBRIUM IONIZATION
AND MAGNETOHYDRODYNAMIC
PHENOMENA,
AD-600 526 DIV. 25

FLUID FLOW
HEAT TRANSFER
APPROXIMATE CALCULATION
OF THE LAMINAR BOUNDARY
LAYER IN AN INCOMPRESSIBLE
FLUID WITH HEAT TRANSFER
AND MASS TRANSFER,
AD-600 103 DIV. 9

FLUID FLOW
HYPERSONIC FLIGHT
MATHEMATICAL ANALYSIS
OF INVISCID FLOW FIELD
BEHIND SPHERE CONES IN
HYPERSONIC FLIGHT,
AD-600 630 DIV. 9

FLUID FLOW
MEASUREMENT
VOID FRACTION MEASUREMENT,
WITH PARTICULAR ATTENTION
GIVEN TO THE RADIOACTIVE
PARTICLE ATTENUATION TECHNIQUES,
AD-600 574 DIV. 9

FLUID FLOW
POTENTIAL THEORY
DEFORMATION OF SOLITARY
WAVES, PART III SHOALING,
AD-600 042 DIV. 9

FLUID MECHANICS
FLUID FLOW
EQUATIONS OF MOTION
IN A MULTICOMPONENT,
CHEMICALLY REACTING GAS,
AD-600 491 DIV. 9

FLUID MECHANICS
GASES
METHODS TO SOLVE THE
EQUATIONS FOR FLUCTUATION
PHENOMENA IN LOW DENSITY
GAS,
AD-600 763 DIV. 9

FLUID MECHANICS
TEMPERATURE
THE NONLINEAR INTERACTION
OF A FINITE NUMBER OF DISTURBANCES
TO A LAYER OF FLUID HEATED
FROM BELOW,
AD-600 115 DIV. 9

FLUID MECHANICS
TRANSPORT PROPERTIES
DISCUSSION OF NESS'S
ANALYSIS FOR A TURBULENT
BOUNDARY LAYER WITH
MASS ADDITION,
AD-600 629 DIV. 9

FLUORESCENCE
MICROSCOPY
BIOLOGICAL APPLICATIONS
OF ULTRAVIOLET FLUORESCENCE
MICROSCOPY,
AD-600 777 DIV. 14

FLUORESCENT SCREENS
DISPLAY SYSTEMS
DEVELOPMENT OF PHOSPHOR
SCREENS FOR HIGH RESOLUTION
DISPLAY DEVICES,
AD-600 724 DIV. 8

FLUTTER
ANALYSIS
TITAN 3 LIQUID CORE
PANELS FLUTTER ANALYSIS,
AD-600 417 DIV. 12

FOOD POISONING
TOXINS - ANTITOXINS
FISH INTOXICATION; THE
TOXIN CAUSING CIGUATERA,
AD-600 446 DIV. 14

FOURIER ANALYSIS
NUMERICAL METHODS AND PROCEDURES
A FAST DIRECT SOLUTION OF
POISSON'S EQUATION USING
FOURIER ANALYSIS,
AD-600 169 DIV. 19

FRACTURE MECHANICS
METALS
METALLURGICAL ANALYSIS
OF CRACK INITIATION
IN METALLIC MATERIALS,
AD-600 327 DIV. 17

FRACTURE (MECHANICS)
IRON
CLEAVAGE FRACTURE IN
POLYCRYSTALLINE IRON,
AD-600 315 DIV. 17

FRACTURE (MECHANICS)
STEEL
INVESTIGATION OF FRACTURE
TOUGHNESS IN HIGH STRENGTH
ALLOYS,
AD-600 008 DIV. 17
DROP-WEIGHT TESTS OF
EXPERIMENTAL HY-130/150
STEELS,
AD-600 795 DIV. 17

FUEL CELLS
REENTRY VEHICLES
SILVER OXIDE-ZINC ION
EXCHANGE FUEL CELLS
FOR MARK-3 RE-ENTRY
VEHICLES,
AD-600 434 DIV. 12

FUEL CELLS
SPACECRAFT
HYDROGEN-OXYGEN CAPILLARY
FUEL CELLS FOR SPACE
VEHICLE APPLICATIONS,
AD-600 658 DIV. 7

FUEL TANKS
CORROSION INHIBITION
THE FIELD EVALUATION OF AN
EXPERIMENTAL AIR DRY FUEL
RESISTANT COATING,
AD-600 030 DIV. 14

FUELS
IGNITION
MEASUREMENT OF THE
TEMPERATURE OF THE
THERMALLY IRRADIATED SURFACE
OF ALPHA CELLULOSE,
AD-600 748 DIV. 10

FUNCTIONAL ANALYSIS
LINEAR SYSTEMS
A FUNCTIONAL DECOMPOSITION
FOR LINEAR DISCRETE SYSTEMS,
AD-600 056 DIV. 19

FUNCTIONAL ANALYSIS
THEOREMS
ORTHONORMAL BASES OF
CONTINUOUS FUNCTIONS
IN A HILBERT SPACE,
AD-600 534 DIV. 15

FUNCTIONS
ON THE PROBLEM OF (P,Q) ANALYTIC
FUNCTIONS OF A COMPLEX VARIABLE
AND THEIR APPLICATIONS,
AD-600 668 DIV. 15
SPECTRAL MEASURES, GENERALIZED
RESOLVENTS, AND FUNCTIONS
OF POSITIVE TYPE,
AD-600 732 DIV. 19

FUNCTIONS
AUTOMATIC PILOTS
FLEXIBLE FLIGHT VEHICLE
TRANSFER FUNCTION FACTORS
FOR USE IN AUTOPILOT
PRELIMINARY DESIGN,
AD-600 672 DIV. 1

FUNCTIONS
TABLES
TABLES OF REGULAR AND
LOGARITHMIC COULOMB WAVE
FUNCTIONS AND TABLES
OF GAMMA FUNCTIONS,
AD-600 286 DIV. 25

FUNGI
PETROLEUM
MICROORGANISMS IN PETROLEUM
PRODUCTS,
AD-600 232 DIV. 10

FUNGUSPROOFING
BIBLIOGRAPHIES
CONTROL OF MICROBIAL
GROWTH ON LEATHER AND
TEXTILES,
AD-600 529 DIV. 14

FUNGUSPROOFING
LEATHER
CONTROL OF MICROBIAL
GROWTH ON LEATHER AND
TEXTILES,
AD-600 529 DIV. 14

FUNGUSPROOFING
TEXTILES
CONTROL OF MICROBIAL
GROWTH ON LEATHER AND
TEXTILES,
AD-600 529 DIV. 14

FURANS
CONDENSATION REACTIONS
STUDIES ON ISONITROSOKETONES,
AD-600 180 DIV. 4

FUSELAGES
VIBRATION
DYNAMIC MODELING OF COMPLEX
STRUCTURES AS A METHOD
FOR THE PREDICTION OF
VIBRATORY RESPONSE AND
STRESS IN FLIGHT VEHICLE
STRUCTURES,
AD-600 234 DIV. 1

FUZES (ORDNANCE)
SIMULATORS
FUZE SIMULATOR VEHICLE,
AD-600 378 DIV. 22

G AGENTS
OXIDATION
STUDY OF CHEMICAL AGENT DECONTAMI-
NATION SYSTEMS FOR MULTIPURPOSE
USE,
AD-600 061 DIV. 3

GALAXIES
MEASUREMENT
RADIAL DISCRETIZATION
IN SPERICAL GALAXIES,
AD-600 372 DIV. 2

GALLIUM ALLOYS
PHOTOCONDUCTIVITY
PHOTOCONDUCTIVITY OF
GALLIUM ANTIMONIDE,
AD-600 178 DIV. 25

GALLIUM COMPOUNDS
ARSENIDES
CAPACITANCE-VOLTAGE DEPENDANCE
OF ZINC-DIFFUSED GAAS
P-N JUNCTIONS. NON-LINEARITY
OF THE IMPURITY DISTRIBUTION
NEAR THE JUNCTION,
AD-600 696 DIV. 8

GALVANIC SKIN RESPONSE
HEART
ESTIMATION OF HEART
PARAMETERS USING SKIN
POTENTIAL MEASUREMENTS,
AD-600 724 DIV. 14

GAME THEORY
DECISION MAKING
OPTIMAL STRATEGIES AND
HUMAN BEHAVIOR IN FUNGUS-EATER
GAME 4,
AD-600 823 DIV. 26

GAME THEORY
DIFFERENTIAL EQUATIONS
DIFFERENTIAL GAMES: A MATHEMATICAL
THEORY WITH APPLICATIONS
TO WARFARE AND OTHER TOPICS,
AD-600 022 DIV. 19

THE IMPORTANCE OF ENGINEERING DOCUMENTATION: TWO LECTURES,
AD-600 394 DIV. 32

ENGINES + MOTORS
LIQUID COOLED
DEVELOPMENT AND TESTING OF AN ENGINE-MOUNTED KIT TO FACILITATE STARTING AND OPERATING LIQUID-COOLED ENGINES AT LOW TEMPERATURES,
AD-600 440 DIV. 27

ENVIRONMENT
SCIENTIFIC RESEARCH
ENVIRONMENTAL INFORMATION PROBLEMS OF RETRIEVAL, COMMUNICATION, AND DISSEMINATION
AD-600 092 DIV. 30

ENVIRONMENTAL TESTS
INSTRUMENTATION
RECOMMENDED CHANGES IN INSTRUMENTS FOR TESTING FOR ENVIRONMENTAL HAZARDS IN SHELTERS,
AD-600 759 DIV. 18
DEPOSITION AND EVALUATION OF EPITAXIAL FILMS ON SINGLE CRYSTAL SUBSTRATES,
AD-600 149 DIV. 25

EPOXIDES
MOLECULAR STRUCTURE
RESEARCH ON IMPROVED EPOXY RESINS,
AD-600 067 DIV. 14

EPOXY PLASTICS
ADHESIVES
EFFECT OF SURFACE PREPARATION AND ELEVATED TEMPERATURE STORAGE ON ADHESIVE BONDS TO ALUMINUM,
AD-600 033 DIV. 14

EPOXY PLASTICS
PHYSICAL PROPERTIES
RESEARCH ON IMPROVED EPOXY RESINS,
AD-600 067 DIV. 14

EPOXY PLASTICS
PLASTIC COATINGS
THE CORROSIVITY OF MAGNESIUM ALLOYS IN 3 AND 20 PERCENT SALT FOG ENVIRONMENTS,
AD-600 029 DIV. 17

EQUATIONS
NUMERICAL ANALYSIS
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM STOCHASTIC TIME -OPTIMAL CONTROL,
AD-600 373 DIV. 15

EQUATIONS OF STATE
SOLID STATE PHYSICS
EQUATIONS OF STATE FOR SOLID BODIES (METALS AND IONIC, VALENT, AND MOLECULAR CRYSTALS),
AD-600 614 DIV. 25

EROSION
TEST EQUIPMENT
ON TESTING MATERIALS FOR CAVITATION DAMAGE RESISTANCE,
AD-600 016 DIV. 9
ERROR DERIVATIVES FOR ELLIPTIC ORBITS,
AD-600 458 DIV. 15

ERRORS
DECODING
CUMULATIVE CODES AS VARIABLE REDUNDANCY CODES,
AD-600 009 DIV. 30

ESTROGENS
THALAMUS
EFFECT OF OVARIAN HORMONES ON THE ACTIVITY OF HYPOTHALAMIC NEURONES,
AD-600 381 DIV. 16

ESTUARIES
EROSION
COASTLINE OF THE COLUMBIA RIVER BETWEEN OREGON AND WASHINGTON,
AD-600 448 DIV. 2

ETCHED CRYSTALS
SOLUBILITY
INHIBITED DISSOLUTION RATES OF (100) SURFACES OF SINGLE CRYSTALS OF LITHIUM FLUORIDE-TECHNIQUE FOR DETERMINATION,
AD-600 328 DIV. 25

EVAPORATION
ARCTIC OCEAN
EVAPORATION AND SENSIBLE HEAT FLUX OVER THE ARCTIC OCEAN,
AD-600 015 DIV. 2

EVAPORATION
COOLING
ETHYL ALCOHOL SOAKED EVAPORATIVE COOLING SHROUDS FOR SOUNDING ROCKET NOSE CONES,
AD-600 726 DIV. 22

EXHAUST GASES
FLUID DYNAMIC PROPERTIES
CALCULATION OF HEAT CAPACITIES AT HIGH TEMPERATURES AND APPLICATION TO GAS DYNAMICAL RELATIONSHIPS,
AD-600 898 DIV. 9

EXHAUST GASES
RETRO ROCKETS
PREDICTION OF PENTRATION DISTANCE OF HIGHLY UNDEREXPANDED RETROROCKET EXHAUST PLUMES INTO AN ONCOMING FREE STREAM,
AD-600 805 DIV. 10

EXHAUST GASES
THERMODYNAMICS
THERMODYNAMIC PROPERTIES OF ROCKET EXHAUST PRODUCTS,
AD-600 280 DIV. 10

EXPANDED PLASTICS
PREPARATION
DEVELOPMENT OF LOW-DENSITY HIGH-STRENGTH FOAMED PLASTICS VIA IONIC POLYMERIZATION,
AD-600 247 DIV. 14

EXPLODING WIRES
EXPLOSIVES INITIATORS
INITIATION OF EXPLOSIVES BY EXPLODING WIRES, III, EFFECT OF WIRE DIAMETER ON THE INITIATION OF PETN BY EXPLODING WIRES,
AD-600 058 DIV. 22

EXPLOSIONS
HIGH ALTITUDE
ELECTROMAGNETIC MEASUREMENTS DURING THE BANSHEE SERIES,
AD-600 665 DIV. 22

EXPLOSIVE MATERIALS
SHAPED CHARGES
SCALING TECHNIQUES FOR SHAPED CHARGES,
AD-600 273 DIV. 22

EXPLOSIVES INITIATORS
EXPLODING WIRES
INITIATION OF EXPLOSIVES BY EXPLODING WIRES, III, EFFECT OF WIRE DIAMETER ON THE INITIATION OF PETN BY EXPLODING WIRES,
AD-600 058 DIV. 22

EXPLOSIVES INITIATORS
LIQUID ROCKET PROPELLANTS
MECHANISM OF EXPLOSION INITIATIONS IN THE STANDARD IMPACT SENSITIVITY TESTER,
AD-600 603 DIV. 10

EXTERIOR BALLISTICS
STATISTICAL ANALYSIS
MATHEMATICAL AND STATISTICAL DEVELOPMENT OF FIXED AND SEQUENTIAL PLANS FOR QUALIFICATION TESTING MUNITION DISPERSION,
AD-600 673 DIV. 22

FANS
AERODYNAMIC CHARACTERISTICS
PRELIMINARY STUDIES OF THE APPLICATION OF PERIPHERAL FANS TO GROUND EFFECT MACHINES, DEVELOPMENT AND EVALUATION OF THE FROST FAN CONCEPT,
AD-600 513 DIV. 1

FATIGUE (MECHANICS)
METALS
NONDESTRUCTIVE EVALUATION OF METAL FATIGUE MAGNETIC INSPECTION OF STRESS CYCLED ROD-TYPE SPECIMENS,
AD-600 277 DIV. 17

FATIGUE (MECHANICS)
TEST METHODS
LINEAR STRAIN THEORY AND THE SMITH METHOD FOR PREDICTING FATIGUE LIFE OF STRUCTURES FOR SPECTRUM TYPE LOADING,
AD-600 879 DIV. 25

FERMIONS
VIBRATION
INVESTIGATION OF THE COLLECTIVE VIBRATIONS OF A MANY-FERMION SYSTEM BY A GENERATOR COORDINATE METHOD,
AD-600 266 DIV. 25

FERRITES
ANTENNA COMPONENTS
FERRITE-FILLED RECTANGULAR SLOT AND LOG CONICAL SPIRAL UHF-VHF ANTENNAS,
AD-600 557 DIV. 8

FERRITES
ANTENNAS
STUDY AND INVESTIGATION OF A UHF-VHF ANTENNA,
AD-600 116 DIV. 8

FERRITES
CRYSTAL GROWTH
ON THE PREPARATION OF SINGLE CRYSTAL FERRITE MATERIALS BY THE FLOATING ZONE TECHNIQUE,
AD-600 062 DIV. 25

FERRITES
DIELECTRIC PROPERTIES
DEVELOPMENT OF ADVANCED MICROWAVE COMPONENTS AND TECHNIQUES -PLANAR HEXAGONAL FERRITES AND DEVICES,
AD-600 871 DIV. 8

FERRITES
WAVE TRANSMISSION
PROPERTIES OF A SURFACE WAVE PROPAGATING ALONG A MAGNETIZED FERRITE ROD,
AD-600 465 DIV. 8

FIBERS (SYNTHETIC)
POLYVINYL ALCOHOL
STUDY OF THE ORIENTATION OF HIGHLY ORDERED REGIONS IN STRENGTHENED POLYVINYL ALCOHOL FIBERS,
AD-600 780 DIV. 14

FIELD THEORY
FERMIONS
INVESTIGATION OF THE COLLECTIVE VIBRATIONS OF A MANY-FERMION SYSTEM BY A GENERATOR COORDINATE METHOD,
AD-600 266 DIV. 25

FIELD THEORY
PHOTONS
GAUGE INVARIANT NON-LOCAL QUANTUM ELECTRODYNAMICS LEADING TO CONVERGENT RESULTS TO EVERY ORDER OF PERTURBATION THEORY,
AD-600 265 DIV. 25
FILAMENT-WOUND EMERGENCY AIR PRESSURE STORAGE VESSELS FOR HIGH-PERFORMANCE AIRCRAFT,
AD-600 215 DIV. 1

FILAMENTS
SYNTHESIS (CHEMISTRY)
HIGH-MODULUS, HIGH-STRENGTH FILAMENT MATERIALS PRODUCED BY VAPOR DEPOSITION OF AL2O3, B4C, AND SILICON CARBIDE,
AD-600 339 DIV. 4

FILAMENTS
VORTICES
CURVATURE AND TORSION OF AN ISOLATED VORTEX FILAMENT,
AD-600 459 DIV. 9

FILMS
ELECTRICAL CONDUCTANCE
MEAN FREE PATH AND BOUNDARY INFLUENCES IN THE METALLIC FIELD EFFECT,
AD-600 681 DIV. 25

FILMS
MEASUREMENT
INTERIOR AND EXIT REGION FILM THICKNESS MEASUREMENTS OF SELF-ACTING FOIL BEARING,
AD-600 657 DIV. 24

FILMS
SINGLE CRYSTALS
DEPOSITION AND EVALUATION OF EPITAXIAL FILMS ON SINGLE CRYSTAL SUBSTRATES,
AD-600 149 DIV. 25

FILTERS (ELECTROMAGNETIC WAVE)
CERAMIC FILTERS
PRODUCTION ENGINEERING MEASURE FOR CERAMIC FILTERS,
AD-600 382 DIV. 9

FINISHES + FINISHING
WOOD
FOREST PRODUCTS LABORATORY NATURAL FINISH FOR WOOD,
AD-600 850 DIV. 14

FIRE CONTROL SYSTEMS
NAVAL VESSELS (CONRATANT)
MISSILE LAUNCHING ZONE ABOARD THE FRENCH SHIP E. E. DU CHAYLA,
AD-600 926 DIV. 12

FIRES
SHELTERS
FIRE HAZARD TO FALLOUT SHELTER OCCUPANTS, A CLASSIFICATION GUIDE,
AD-600 261 DIV. 13

FIRE-RESISTANT TEXTILES
AIRCRAFT
AIRCRAFT INTERIOR MATERIALS TESTING FOR FLAMMABILITY AND SMOKE CHARACTERISTICS,
AD-600 387 DIV. 1

FIRING MECHANISMS (AMMUNITION)
ENERGY
KINETIC ENERGY MEASURING SYSTEM FOR XMS TIMER,
AD-600 189 DIV. 22

FISHE-
TOXICITY
FISH INTOXICATION; THE TOXIN CAUSING CIGUATERA,
AD-600 446 DIV. 16

FISSION PRODUCT ACTIVITY
STRONTIUM
DECAY CHARACTERISTICS OF SR93 AS DETERMINED BY GAMMA-RAY SCINTILLATION SPECTROMETRY AND BETA-RAY

GROUND EFFECT
WINGS
WIND TUNNEL INVESTIGATION OF SINGLE AND TANDEM LOW-ASPECT-RATIO WINGS IN GROUND EFFECT,
AD-600 498 DIV. 9

GROUND EFFECT MACHINES
CAPTIVE TESTS
STATIC PERFORMANCE OF AN ASPECT RATIO 2/3 PERIPHERAL JET GROUND EFFECT MACHINE,
AD-600 567 DIV. 1

GROUND EFFECT MACHINES
LIFT
PRELIMINARY STUDIES OF THE APPLICATION OF PERIPHERAL FANS TO GROUND EFFECT MACHINES, DEVELOPMENT AND EVALUATION OF THE FROST FAN CONCEPT,
AD-600 513 DIV. 1

GROUND SUPPORT EQUIPMENT
SUPPORT OF THE UPPER AIR ROCKET RESEARCH PROGRAM,
AD-600 269 DIV. 6

GROUND SUPPORT EQUIPMENT
GUIDED MISSILES
VANDENBERG AFB GROUND ELECTRONIC SYSTEM TEST PLAN FOR MS-133B MINUTEMAN
AD-600 621 DIV. 12
DECISION-MAKING AND COMMUNICATION PATTERNS UNDER STRESS AND OVERLOAD WHEN THE PARTICIPANTS FUNCTION AS A SELF-ORGANIZING SYSTEM,
AD-600 181 DIV. 28

GUIDANCE
ROCKETS
AUTOMATIC HOMING AND COMBINED ROCKET GUIDANCE SYSTEMS,
AD-600 488 DIV. 12

GUIDE VANES
TURBINES
BLADELESS GUIDE VANE FOR CENTRIPETAL TURBINES,
AD-600 608 DIV. 27

GUIDED BOMBS
TRACKING
ACCURACY OF THE AZON GUIDED BOMB UNDER WW II COMBAT CONDITIONS3
HUMAN FACTORS,
AD-600 601 DIV. 12

GUIDED MISSILE LAUNCHERS
NAVAL VESSELS (COMBATANT)
MISSILE LAUNCHING ZONE ABOARD THE FRENCH SHIP E. E. DU CHAYLA,
AD-600 426 DIV. 12

GUIDED MISSILE RANGES
TIME SIGNALS
INTER-GUIDED MISSILE RANGE INSTRUMENTATION GROUP STANDARD INSTRUMENTATION TIMING FORMATS,
AD-600 440 DIV. 12

GUIDED MISSILE TRACKING SYSTEMS
DATA PROCESSING SYSTEMS
JOINT AFMTC/RANGE USER DATA CONFERENCE (5TH),
AD-600 091 DIV. 12

GUIDED MISSILE TRAJECTORIES
MATHEMATICAL ANALYSIS
ANALYTIC SOLUTIONS TO THE EQUATIONS OF MOTION OF MISSILES HAVING SIX DEGREES OF FREEDOM,
AD-600 544 DIV. 12

GUIDED MISSILE TRAJECTORIES
MEASUREMENT
JOINT AFMTC/RANGE USER DATA CONFERENCE (5TH),
AD-600 091 DIV. 12

GUIDED MISSILES
GROUND SUPPORT EQUIPMENT
VANDENBERG AFB GROUND ELECTRONIC SYSTEM TEST PLAN FOR MS-133B MINUTEMAN
AD-600 621 DIV. 12

GUIDED MISSILES
MODEL TESTS
DYNAMIC MODELING OF COMPLEX STRUCTURES AS A METHOD FOR THE PREDICTION OF VIBRATORY RESPONSE AND STRESS IN FLIGHT VEHICLE STRUCTURES,
AD-600 234 DIV. 1

GUIDED MISSILES
PANELS (STRUCTURAL)
TITAN 3 LIQUID CORE PANELS FLUTTER ANALYSIS,
AD-600 417 DIV. 12

GUIDED MISSILES
TRACKING
COMPILATION OF ABSTRACTS REVIEWING SOVIET DEVELOPMENT IN THE TRACKING OF MISSILES AND SPACE VEHICLES,
AD-600 656 DIV. 12

GUN AUXILIARY EQUIPMENT
HOWITZERS
AUXILIARY PROPULSION KIT TO PROVIDE THE 105 MM HOWITZER XM-102 WITH ITS OWN MOBILE POWER,
AD-600 313 DIV. 28

GUN MOUNTS
RECOIL MECHANISMS
VEHICULAR MOUNT SIMULATOR-ANALYZER: USING A HYDRAULIC SERVOMECHANISM TO SIMULATE THE CHARACTERISTIC OF A SPRING,
AD-600 537 DIV. 22

GYROSCOPES
INSTRUMENTATION
GYROSCOPIC EFFECT, ITS PHENOMENA AND APPLICATION (SELECTED CHAPTERS),
AD-600 041 DIV. 19

GYROSCOPES
NUCLEAR MAGNETIC RESONANCE
DESIGN AND OPERATION OF A NUCLEAR GYROSCOPE,
AD-600 145 DIV. 20

HAMILTONIAN
DIFFERENTIAL EQUATIONS
THEOREM OF A. N. KOLMOGOROV CONCERNING THE CONSERVATION OF CONDITIONALLY PERIODIC MOTIONS WITH SMALL CHANGE OF THE HAMILTONIAN FUNCTION,
AD-600 136 DIV. 25

HANDBOOKS
ATMOSPHERIC SOUNDING
HANDBOOK ON THE HIGH-ALTITUDE VERTICAL-HORIZONTAL SOUNDING OF THE ATMOSPHERE BY THE IL-28 AIRCRAFT,
AD-600 134 DIV. 1

HEALTH PHYSICS INSTRUMENTATION
RECOMMENDED CHANGES IN INSTRUMENTS FOR TESTING FOR ENVIRONMENTAL HAZARDS IN SHELTERS,
AD-600 759 DIV. 18

HEALTH PHYSICS INSTRUMENTATION
DOSIMETERS
MEASUREMENT OF TISSUE DOSE CONTRIBUTION OF THERMAL, INTERMEDIATE, AND FAST NEUTRONS WITH THE SOVIET RUS-SERIES DOSIMETERS,
AD-600 135 DIV. 20
DOSIMETERS OF IONIZING RADIATION BASED ON THE MEASUREMENT OF THERMOLUMINESCENCE OF ALUMOPHOSPHATE GLASSES (TIKS) DOSIMETERS),
AD-600 493 DIV. 20

HEARING
PSYCHOACOUSTICS
TRANSMISSION AND CODING OF INFORMATION IN AUDITORY NERVOUS SYSTEM,
AD-600 222 DIV. 14

HEART
BIONICS
ELECTRONIC DEVICE FOR SIMULATING THE ELECTRICAL ACTIVITY OF THE HEART,
AD-600 580 DIV. 16

HEART
GALVANIC SKIN RESPONSE
ESTIMATION OF HEART PARAMETERS USING SKIN POTENTIAL MEASUREMENTS,
AD-600 754 DIV. 16

HEART
PULSE RATE
RELATION OF CHANGES IN THE HEART RATE TO MENTAL WORK AND EMOTIONS,
AD-600 554 DIV. 16

HEAT RESISTANT METALS + ALLOYS
THERMAL CONDUCTIVITY
ANALOG STUDY OF THE EFFECT OF THERMAL CONDUCTIVITY OF A MATERIAL ON THE HEAT IN A TURBINE BLADE,
AD-600 609 DIV. 27

HEAT RESISTANT PLASTICS
SILANES
SYNTHESIS OF REGULATED STRUCTURE POLYPHENYLETHER-SILOXANE BLOCK COPOLYMERS,
AD-600 121 DIV. 14
ABLATION OF A SOLID SPHERE OF LOW THERMAL CONDUCTIVITY MATERIAL,
AD-600 173 DIV. 25
HEAT AND MASS TRANSFER DURING ABLATION OF POLYMERIC MATERIALS,
AD-600 631 DIV. 14

HEAT SHIELDS
MATERIALS
RE-RADIATIVE STRUCTURES AND MATERIALS FOR RE-ENTRY VEHICLES,
AD-600 626 DIV. 12

HEAT TRANSFER
ARCTIC OCEAN
EVAPORATION AND SENSIBLE HEAT FLUX OVER THE ARCTIC OCEAN,
AD-600 015 DIV. 2

HEAT TRANSFER
DENSITY
LOW DENSITY EFFECTS ON HEAT TRANSFER IN HYPERSONIC FLIGHT,
AD-600 639 DIV. 25

HEAT TRANSFER
GEOMETRIC FORMS
EFFECT OF ANGLE ATTACK ON LAMINAR CONNECTIVE HEAT TRANSFER ON SHARP AND BLUNT CONES,
AD-600 628 DIV. 9

HEAT TRANSFER
HYPERSONIC FLOW
HEAT TRANSFER TO FLAT PLATE IN HIGH-TEMPERATURE RAREFIED ULTRA-HIGH MACH NUMBER FLOW,
AD-600 344 DIV. 9

HEAT TRANSFER
POROUS MATERIALS
HEAT EXCHANGE IN A LIQUID PREHEATED POROUS PLATE IN A GAS STREAM,
AD-600 258 DIV. 9

HEAT TREATMENT
STEEL
EFFECTS OF RAPID HEAT TREATMENT ON THE MECHANICAL PROPERTIES OF A S 1/4 NI-CR-MO-V STEEL,
AD-600 791 DIV. 17

HEATING ELEMENTS
GRAPHITE
FURTHER DEVELOPMENT OF A GRAPHITE HEATER FOR HIGH PRESSURE NITROGEN OPERATION,
AD-600 010 DIV. 30

HEATING PLANTS
PROTECTIVE SHELTERS
HEAT-LOSS STUDY OF ARMY BARRACKS IN POLAR REGIONS AND DESCRIPTION OF TWO HEATING SYSTEMS,
AD-600 619 DIV. 13

HEAT-RESISTANT PLASTICS
POLYAMIDE PLASTICS
SYNTHESIS OF HIGH MELTING POLYPYRAZOLES,
AD-600 815 DIV. 4

HEIGHT FINDING
ALTIMETERS
STUDY OF INTEGRITY, RELIABILITY, AND ACCURACY OF AUTOMATIC HEIGHT REPORTING SYSTEM VIA ATC RADAR BEACON SYSTEM,
AD-600 137 DIV. 1

HELICOPTERS
FLIGHT TESTING
HIGH-PERFORMANCE ELECTROSTATIC DISCHARGES FOR HELICOPTERS,
AD-600 451 DIV. 1

HELIUM
DEUTERON BOMBARDMENT
REACTION OF HE3 WITH DEUTERONS,
AD-600 605 DIV. 20

HELIUM
PLASMA PHYSICS
ELECTRON INTERACTIONS IN CRYOGENIC HELIUM PLASMAS,
AD-600 045 DIV. 25

HELIUM GROUP GASES
PHYSIOLOGY
THE PHYSIOLOGICAL EFFECTS OF ARGON, HELIUM, AND THE RARE GASES,
AD-600 641 DIV. 16

HEPATITIS (NONVIRAL)
KIDNEYS
METABOLISM OF PROTEINS, AMINO ACIDS, AND AMMONIA IN PATIENTS WITH LIVER DISEASE,
AD-600 699 DIV. 16

HIGH-PRESSURE RESEARCH
LIQUID JETS
A HYDROPNEUMATIC METHOD OF LIQUID JET BLOWOUT UNDER HIGH PRESSURE,
AD-600 817 DIV. 9

HOISTS
CONTROL SYSTEMS
DEPTH REGULATION OF LOWERED OCEANOGRAPHIC EQUIPMENT,
AD-600 187 DIV. 31

HOMING DEVICES
ROCKETS
AUTOMATIC HOMING AND COMBINED ROCKET GUIDANCE SYSTEMS,
AD-600 488 DIV. 12

HONEYCOMB CORES
SANDWICH PANELS
INVESTIGATION OF THE TEMPERATURE FIELD IN AN ASSYMETRICALLY HEATED SANDWICH PLATE WITH A HONEYCOMB CORE,
AD-600 130 DIV. 25

GAMMA COUNTERS
SEMICONDUCTOR DEVICES
DEVELOPMENT AND EVALUATION OF A LOW COST 1-100 R/HR GAMMA RADIATION SURVEY METER,
AD-600 090 DIV. 20

GAMMA EMISSION
SOURCES
INDUCED GAMMA-RAY EMISSION FEASIBILITY STUDY OF ELECTROMAGNETIC WAVE GENERATORS,
AD-600 270 DIV. 20

GAMMA-RAY SPECTRA
MEASUREMENT
PENETRATION OF PLANE NORMAL GAMMA RAYS THROUGH SLABS OF ALUMINUM AND STEEL. III PROCESSED NUMERICAL DATA,
AD-600 392 DIV. 20

GAS DISCHARGES
DENSITY
ENHANCEMENT OF PLASMA DENSITY IN AN ARC DISCHARGE,
AD-600 542 DIV. 25

GAS FILTERS
AIR
CHARACTERISTICS OF AIR FILTER MEDIA USED FOR MONITORING AIRBORNE RADIOACTIVITY,
AD-600 292 DIV. 2
SPECIAL TEST EVALUATION REPORTS FOR AMERICAN AIR FILTER ECP 90 INVESTIGATION ST -101,
AD-600 866 DIV. 13

GAS FLOW
CHEMICAL REACTIONS
GENERALIZED VELOCITY POTENTIAL EQUATION FOR PLURI-REACTING MIXTURES,
AD-600 098 DIV. 9

GAS FLOW
ELECTRIC ARCS
BASIC RESEARCH ON GAS FLOWS THROUGH ELECTRIC ARCS-HOT GAS CONTAINMENT LIMITS,
AD-600 798 DIV. 25

GAS FLOW
TEMPERATURE
EVALUATION OF 0.000025 IN. DIA., 90% PLATINUM-10% RHODIUM WIRE AS A RESISTANCE THERMOMETER, MEASUREMENT OF TEMPERATURE FLUCTUATIONS IN THERMAL LAYER IN AN AIR FLOW ABOVE A FLAT PLATE,
AD-600 346 DIV. 30

GAS FLOW
THERMODYNAMICS
GAS-SOLID FLOW,
AD-600 248 DIV. 9

GAS FLOW
TURBULENCE
TURBULENT MIXING OF COAXIAL FLOWS IN A CHANNEL OF CONSTANT CROSS SECTION,
AD-600 237 DIV. 9

GAS IONIZATION
FLAMES
GAS IONIZATION IN FLAMES AND IDENTIFICATION OF THE NEGATIVE FLAME IONS,
AD-600 456 DIV. 25

GAS IONIZATION
NITROGEN
MASS SPECTROMETER STUDIES OF IONIZATION PROCESSES IN NITROGEN,
AD-600 311 DIV. 25

GAS IONIZATION
XENON
INVESTIGATION OF MAGNETICALLY INDUCED IONIZATION OF XENON USING MHD GENERATORS,
AD-600 531 DIV. 25

GAS PUMPS
ROTARY PUMP
PRELIMINARY STUDIES OF THE APPLICATION OF PERIPHERAL FANS TO GROUND EFFECT MACHINES, DEVELOPMENT AND EVALUATION OF THE FROST FAN CONCEPT,
AD-600 513 DIV. 1

GAS TURBINE ROTORS
STABILIZATION
SELF-ALIGNMENT AND BALANCING OF COAXIAL GAS-TURBINE ROTORS,
AD-600 487 DIV. 27

GAS TURBINE ROTORS
THERMAL STRESSES
CALCULATION OF THE DISTRIBUTION OF TEMPERATURE IN THE ROTARY GAS TURBINE DISK AND AN ANALYSIS OF THE ORIGINATED THERMAL STRESSES,
AD-600 506 DIV. 27

GASES
DISTRIBUTION
THE DISTRIBUTION OF GASES IN THE PROTOPLANETARY NEBULA,
AD-600 023 DIV. 2

GASES
FLUID DYNAMIC PROPERTIES
GAS-SOLID FLOW,
AD-600 248 DIV. 9

GASES
OSCILLATION
METHODS TO SOLVE THE EQUATIONS FOR FLUCTUATION PHENOMENA IN LOW DENSITY GAS,
AD-600 763 DIV. 9

GENERATORS
DESIGN
ROTATING MACHINERY UTILIZING SUPERCONDUCTORS,
AD-600 662 DIV. 7

GENERATORS
HIGH FREQUENCY
POWER CONVERSION AND GENERATION TECHNIQUES FOR ELECTRIC PROPULSION ENGINES,
AD-600 833 DIV. 7

GENETICS
SPACE FLIGHT
CHANGES IN CHROMOSOMES OF SPORES OF TRANDESCANTIA PALUDOSA WHICH WERE PUT ON VOSTOK 3 AND 4 ARE SUMMARIZED,
AD-600 802 DIV. 14

GEODESICS
EXPERIMENTAL DATA
GEODETIC EXPERIMENT BY MEANS OF A TORSION BALANCE,
AD-600 012 DIV. 2

GEODESICS
GRAVITY
THE EFFECT OF TOPOGRAPHY AND ITS ISOSTATIC COMPENSATION ON FREE AIR GRAVITY ANOMALIES,
AD-600 011 DIV. 2
ACCURACY OF THE GEOID UNDULATIONS AND THE DEFLECTIONS OF THE VERTICAL
AD-600 671 DIV. 2

GEODESICS
OPTICAL INSTRUMENTS
GEODIMETER SVV-1 AND THE RESULTS OF ITS PROVING TESTS,
AD-600 786 DIV. 2

GEODESICS
SURVEYING
ORDER OF MAGNITUDE OF THE INFLUENCE OF NEARBY TOPOGRAPHY ON THE DEFLECTIONS OF THE VERTICAL,
AD-600 670 DIV. 2

GEOPHYSICS
NEW YORK
INVESTIGATIONS OF ELECTRICAL CHARACTERISTICS OF ROCK MEDIA SURROUNDING DRILL HOLES IN NEW YORK STATE,
AD-600 758 DIV. 2

GERMANIUM
METAL FILMS
ULTRA HIGH VACUUM SPUTTERING TECHNIQUES FOR THE FORMATION OF THIN SEMICONDUCTOR FILMS,
AD-600 799 DIV. 25

GERM-FREE ATMOSPHERES
SURGERY
DESCRIPTION OF CONSTRUCTION, INSTALLATION, AND MAINTENANCE OF A GERM-FREE OPERATING ROOM,
AD-600 721 DIV. 14

GLACIERS
SHEAR STRESSES
INVESTIGATION OF SHEAR ZONES IN THE ICE CAP MARGIN, THULE, GREENLAND,
AD-600 074 DIV. 2

GLASS
CRYSTALLIZATION
STUDIES RELATED TO THE CRYSTALLIZATION OF GLASSES: CONTROLLED PHASE SEPARATION DUE TO METASTABLE LIQUID IMMISCIBILITY IN SIMPLE SILICATE SYSTEMS,
AD-600 744 DIV. 14

GLASS
LUMINESCENCE
DOSIMETERS OF IONIZING RADIATION BASED ON THE MEASUREMENT OF THERMOLUMINESCENCE OF ALUMOPHOSPHATE GLASSES ('IKS' DOSIMETERS),
AD-600 493 DIV. 20

GLASS
SILVER
OPTICAL AND ELECTRICAL PROPERTIES OF SILVER FILMS IN GLASS USED IN PHOTOCATHODES,
AD-600 225 DIV. 8

GLASS TEXTILES
AIRCRAFT FIRES
AIRCRAFT INTERIOR MATERIALS TESTING FOR FLAMMABILITY AND SMOKE CHARACTERISTICS,
AD-600 387 DIV. 1

GLIDERS
AERODYNAMIC CHARACTERISTICS
ENGINEERING SPECIFICATIONS AND AERODYNAMIC CHARACTERISTICS OF SOVIET KAI-19 GLIDER,
AD-600 818 DIV. 1

GLYCOLS
WATER
DEVELOPMENT OF FIRE-RESISTANT, WATERBASED ADDITIVES FOR HYDRAULIC FLUIDS,
AD-600 568 DIV. 14

GOLD
ACOUSTIC PROPERTIES
ACOUSTIC EMISSION IN GOLD SINGLE CRYSTALS UNDER APPLIED STRESS: ROLE OF THE SURFACE AND SURFACE FILMS,
AD-600 233 DIV. 25

GRAIN BOUNDARIES
ELECTRICAL PROPERTIES
ELECTRICAL CHARACTERISTICS OF GRAIN BOUNDARIES IN COMPOUND SEMICONDUCTORS,
AD-600 321 DIV. 25

GRAIN BOUNDARIES
SEMICONDUCTORS
ELECTRICAL CHARACTERISTICS OF GRAIN BOUNDARIES IN COMPOUND SEMICONDUCTORS,
AD-600 321 DIV. 25

GRAIN STRUCTURES (METALLURGY)
REVIEWS
MATERIALS -4340 STEEL -STRESS CORROSION AND EFFECTS OF BANDING -LITERATURE SURVEY, PART III EFFECTS OF BANDING,
AD-600 034 DIV. 17

GRAPHICS
DATA PROCESSING SYSTEMS
CRITERION FOR CHOOSING THE GRID SIZE USED WHEN PLANAR CONTOUR CURVES ARE ENCODED IN DIGITAL FORM,
AD-600 310 DIV. 30
STUDY AND EXPERIMENTAL INVESTIGATION OF PATTERN RECOGNITION SYSTEMS SUITABLE FOR GRAPHICAL DATA PROCESSING,
AD-600 331 DIV. 30

GRAPHITE
COMPOSITE MATERIALS
OXIDATION-RESISTANT GRAPHITE BASE COMPOSITES,
AD-600 340 DIV. 14

GRAPHITE
CRYSTAL STRUCTURE
CRYSTAL STRUCTURE OF SYNTHETIC GRAPHITE MATERIALS,
AD-600 760 DIV. 14

GRAPHITE
RADIOGRAPHY
RADIOGRAPHY OF CARBON AND GRAPHITE,
AD-600 339 DIV. 14

GRAPHITE
SOUND TRANSMISSION
EXPERIMENTAL METHOD OF DETERMINING THE VELOCITY OF SOUND IN GRAPHITE,
AD-600 876 DIV. 14

GRAPHITE
TENSILE PROPERTIES
HIGH-TEMPERATURE TENSILE PROPERTIES OF ZTA GRADE GRAPHITE,
AD-600 466 DIV. 14

GRAPHITED MATERIALS
SINGLE CRYSTALS
CRYSTAL STRUCTURE OF SYNTHETIC GRAPHITE MATERIALS,
AD-600 760 DIV. 14

GRAVITY
GEODESICS
THE EFFECT OF TOPOGRAPHY AND ITS ISOSTATIC COMPENSATION ON FREE AIR GRAVITY ANOMALIES,
AD-600 011 DIV. 2

GRAVITY
MEASUREMENT
ACCURACY OF THE GEOID UNDULATIONS AND THE DEFLECTIONS OF THE VERTICAL
AD-600 671 DIV. 2

GRINDERS
TIME STUDIES
NOPP STANDARD TIME FORMULA GR-5 REPORT FOR CENTERLESS GRINDER OPERATION TIME STUDIES,
AD-600 194 DIV. 24
NOPP STANDARD TIME FORMULA GR-2 FOR INTERNAL GRINDING OPERATION TIME STUDIES,
AD-600 197 DIV. 24
NOPP STANDARD TIME FORMULA GR4 FOR MATTISON SURFACE GRINDER OPERATION TIME STUDIES,
AD-600 198 DIV. 24

PRODUCTION CONTROL
PRODUCTION ENGINEERING MEASURE) RELIABILITY IMPROVEMENT; SILICON ALLOY TRANSISTOR, VOLUME III: PROCESS SPECIFICATION MANUAL,
AD-600 025 DIV. 8

INSTRUMENTATION
CLASSIFICATION
DEVELOPMENT OF A SYSTEM OF CLASSIFICATION OF INERTIAL NAVIGATION SENSORS THAT WILL AID IN THE PREDICTION OF PERFORMANCE,
AD-600 570 DIV. 19
DEVELOPMENT OF A SYSTEM OF CLASSIFICATION OF INERTIAL NAVIGATION SENSORS THAT WILL AID IN THE PREDICTION OF PERFORMANCE,
AD-600 571 DIV. 19

INSTRUMENTATION
ENVIRONMENTAL TESTS
RECOMMENDED CHANGES IN INSTRUMENTS FOR TESTING FOR ENVIRONMENTAL HAZARDS IN SHELTERS,
AD-600 759 DIV. 14

INTEGRAL EQUATIONS
PROPERTIES OF WEAK SOLUTIONS OF CERTAIN SINGULAR INTEGRODIFFERENTIAL EQUATIONS,
AD-600 337 DIV. 15

INTEGRAL EQUATIONS
NUMERICAL ANALYSIS
NUMERICAL TREATMENT OF AN INTEGRAL EQUATION DERIVED IN THE ANALYSIS OF THE STRESS FIELD IN A CYLINDER CONTAINING A PENNY-SHAPED CRACK,
AD-600 497 DIV. 25

INTEGRAL EQUATIONS
THEORY
APPLICATION OF SINGULAR INTEGRAL-EQUATION THEORY TO A LINEARIZED PROBLEM IN COUETTE FLOW,
AD-600 832 DIV. 9

INTEGRAL TRANSFORMS
MATHEMATICS
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM-IVI NONLINEAR EQUATIONS,
AD-600 161 DIV. 15
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM-VI MISMATCHED SYSTEMS OF LINEAR DIFFERENTIAL EQUATIONS,
AD-600 162 DIV. 15

INTEGRAL TRANSFORMS
STOCHASTIC PROCESSES
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM STOCHASTIC TIME -OPTIMAL CONTROL,
AD-600 373 DIV. 15

INTEGRATED CIRCUITS
ANTENNAS
RESEARCH ON TECHNIQUES FOR INTEGRATION OF ACTIVE ELEMENTS INTO ANTENNAS AND ANTENNA STRUCTURE,
AD-600 105 DIV. 8

INTEGRATED CIRCUITS
TRANSISTORS
ENGINEERING SERVICES ON TRANSISTORS
AD-600 099 DIV. 8

INTERCOMMUNICATION SYSTEMS
LAUNCHING SITES
PRODUCTION ACCEPTANCE TESTING OF CABLE SPLICE CASES FOR MINUTEMAN INTERSITE COMMUNICATIONS SYSTEMS,
AD-600 716 DIV. 12

INTERFEROMETERS
LASERS
INVESTIGATION OF A LASER/INTERFEROMETER INERTIAL PLATFORM ATTITUDE MONITORING DEVICE,
AD-600 730 DIV. 1

INTERNAL COMBUSTION ENGINES
ENGINE STARTERS
DEVELOPMENT AND TESTING OF AN ENGINE-MOUNTED KIT TO FACILITATE STARTING AND OPERATING LIQUID-COOLED ENGINES AT LOW TEMPERATURES,
AD-600 440 DIV. 27

INTERNAL FRICTION
MARTENSITE
SURVEY OF LITERATURE DEALING WITH THE INTERNAL FRICTION OF MARTENSITE,
AD-600 848 DIV. 17

INVERTERS
SONAR EQUIPMENT
PERFORMANCE AND ANALYSIS OF SONAR TRANSMITTER USING PARALLEL INVERTER UNIT,
AD-600 377 DIV. 8

ION SOURCES
PROTONS
UTILIZATION OF A HIGH PULSE IN PROTON SOURCES,
AD-600 586 DIV. 25

IONIZATION
MAGNETOHYDRODYNAMICS
NON-EQUILIBRIUM IONIZATION AND MAGNETOHYDRODYNAMIC PHENOMENA,
AD-600 526 DIV. 25

IONIZED GASES
PERTURBATION THEORY
ROTATIONAL EXCITATION OF MOLECULAR IONS BY ELECTRONS,
AD-600 430 DIV. 25

IONS
ELECTRONS
GAS IONIZATION IN FLAMES AND IDENTIFICATION OF THE NEGATIVE FLAME IONS,
AD-600 456 DIV. 25

IRON
CORROSION
POLARIZATION BEHAVIOR OF ARMCO IRON IN SULFURIC ACID SOLUTIONS,
AD-600 563 DIV. 17

IRON
ELECTROCHEMISTRY
POLARIZATION BEHAVIOR OF ARMCO IRON IN SULFURIC ACID SOLUTIONS,
AD-600 563 DIV. 17

IRON ALLOYS
MECHANICAL PROPERTIES
STRENGTHENING IRON-BASE ALLOYS BY SHOCK WAVES,
AD-600 579 DIV. 17

IRREVERSIBLE PROCESSES
STATISTICAL MECHANICS
STATISTICAL MECHANICS AND IRREVERSIBILITY,
AD-600 072 DIV. 4

IRREVERSIBLE PROCESSES
THERMODYNAMICS
NOTE ON A PAPER BY SLIEPCEVICH AND FINN,
AD-600 073 DIV. 4

ISOCYANATE PLASTICS
SHELTERS
RIGID FOAM PLASTICS SHELTERS, GREENLAND FIELD TESTS,
AD-600 654 DIV. 14

ISOTOPES
NUCLEAR CROSS SECTIONS
REACTION OF HE3 WITH DEUTERONS,
AD-600 603 DIV. 20

ITERATIVE METHODS
LINEAR SYSTEMS
PARAMETER ESTIMATION IN NOISY SYSTEMS,
AD-600 174 DIV. 8

JATOS
STORAGE
SHELF LIFE OF 16-NS-1000, MIS ROCKET MOTORS,
AD-600 324 DIV. 27

JET ENGINE FUELS
IGNITION
IGNITION CHARACTERISTICS OF FUELS AND LUBRICANTS,
AD-600 002 DIV. 10

JET ENGINE FUELS
PETROLEUM
MICROORGANISMS IN PETROLEUM PRODUCTS,
AD-600 232 DIV. 10

JET MIXING FLOW
TWO-DIMENSIONAL FLOW
VISCOUS MIXING OF TWO-DIMENSIONAL JETS WITH PARTICULAR REFERENCE TO JETS IN GROUND PROXIMITY,
AD-600 499 DIV. 9

JET STREAMS (METEOROLOGY)
DATA
TROSPHERIC WIND PROFILE DESIGN CRITERIA; DATA, AND TECHNIQUES FOR AEROSPACE VEHICLE DESIGN,
AD-600 300 DIV. 2

JETS
PENETRATION
PREDICTION OF PENETRATION DISTANCE OF HIGHLY UNDEREXPANDED RETROROCKET EXHAUST PLUMES INTO AN ONCOMING FREE STREAM,
AD-600 805 DIV. 10

JIGS
DRILLS
NOPP STANDARD TIME FORMULA F-1 FOR JIG OPERATION TIME STUDIES,
AD-600 196 DIV. 26
STUDIES ON THE NATURE OF THE ABNORMALITIES IN SOLUTE AND WATER EXCRETION IN ACUTE TUBULAR NECROSIS AND OTHER RENAL DISEASES,
AD-600 003 DIV. 16

KIDNEYS
HEPATITIS (NONVIRAL)
METABOLISM OF PROTEINS, AMINO ACIDS, AND AMMONIA IN PATIENTS WITH LIVER DISEASE,
AD-600 699 DIV. 16

KLEBSIELLA PNEUMONIAE
SPACE ENVIRONMENTAL CONDITIONS
EFFECTS OF SPACE CABIN ENVIRONMENTS ON RESISTANCE OF MICE TO INFECTION WITH KLEBSIELLA PNEUMONIAE,
AD-600 408 DIV. 16

KLYSTRONS
DESIGN
HIGH POWER X-BAND GENERATOR,
AD-600 019 DIV. 8

LAMINAR BOUNDARY LAYER
NUMERICAL ANALYSIS
APPROXIMATE CALCULATION OF THE LAMINAR BOUNDARY LAYER IN AN INCOMPRESSIBLE FLUID WITH HEAT TRANSFER AND MASS TRANSFER,
AD-600 183 DIV. 9
APPROXIMATION METHOD OF COMPUTING THE THREE-DIMENSIONAL LAMINAR BOUNDRY LAYER,
AD-600 524 DIV. 9

LAMINAR BOUNDARY LAYER
STABILITY
ON HYDRODYNAMIC STABILITY OF TWO-DIMENSIONAL UNSTEADY INCOMPRESSIBLE LAMINAR BOUNDARY LAYERS,
AD-600 102 DIV. 9

LAMINAR BOUNDARY LAYER
TRANSPORT PROPERTIES
LAMINAR BOUNDARY LAYER WITH HYDROGEN INJECTION INCLUDING MULTICOMPONENT DIFFUSION,
AD-600 862 DIV. 9

LAMINAR FLOW
SEPARATION
SUPERSONIC SEPARATED AND REATTACHING LAMINAR FLOWS) I. GENERAL THEORY AND APPLICATION TO ADIABATIC BOUNDARY LAYER-SHOCK WAVE INTERACTIONS,
AD-600 097 DIV. 9

LAMINATED PLASTICS
PROSTHETICS
SHRINKABLE SOCKETS PLASTIC PREFORMS TO CONFORM TO AN AMPUTEE'S STUMP,
AD-600 806 DIV. 16

LAMINATED PLASTICS
SHEAR STRESSES
METHODS FOR EVALUATING SHEAR STRENGTH OF PLASTIC LAMINATES REINFORCED WITH UNWOVEN GLASS FIBERS,
AD-600 860 DIV. 14

LAMINATES
TOUGHNESS
STRUCTURAL DESIGN INFORMATION ON BIRD-IMPACT RESISTANT WINDSHIELDS FOR HIGH PERFORMANCE, TRANSPORT AIRCRCRAFT, GLASS AND PLASTIC LAMINATED WINDSHIELDS,
AD-600 359 DIV. 1

LANGUAGE
ANALYSIS
DISCONTINUOUS VERBS IN THE ENGLISH LANGUAGE,
AD-600 219 DIV. 32
ENGLISH PRONOUNS AND THEIR VERBAL AGREEMENT,
AD-600 220 DIV. 32

LANGUAGE
SCIENTIFIC RESEARCH
LINGUISTICS BRAIN RESEARCH AND SPEECH PATHOLOGY,
AD-600 495 DIV. 16

LAPSE RATE
BALOONS
RELATIONSHIP BETWEEN TEMPERATURE LAPSE RATE AND BALLOON ASCENT RATE,
AD-600 433 DIV. 1

LASERS
DESIGN
SOLID STATE LASERS) MODE STUDIES, CW OPERATION, MATERIALS GROWTH, SPECTROSCOPY,
AD-600 267 DIV. 25

LASERS
INTERFEROMETERS
INVESTIGATION OF A LASER/INTERFEROMETER INERTIAL PLATFORM ATTITUDE MONITORING DEVICE,
AD-600 730 DIV. 1
SOLID STATE LASERS) MODE STUDIES, CW OPERATION, MATERIALS GROWTH, SPECTROSCOPY,
AD-600 267 DIV. 25

HOSPITALS
MILITARY PERSONNEL
MEASURING THE UTILIZATION OF A FEDERAL SHORT TERM GENERAL HOSPITAL,
AD-600 481 DIV. 16

HOWITZERS
PROPULSION
AUXILIARY PROPULSION KIT TO PROVIDE THE 105 MM HOWITZER XM-102 WITH ITS OWN MOBILE POWER,
AD-600 313 DIV. 22

HUMAN ENGINEERING
BIOPHYSICS
FOUR MONOGRAPHS ON HUMAN MECHANICS -HUMAN ENGINEERING STUDIES,
AD-600 618 DIV. 28

HYDRAULIC FLUIDS
FLAMMABILITY
FIRE-RESISTANT WATER BASE HYDRAULIC FLUID, PARTIAL ALKYLESTER ALKALI SALTS OF PHOSPHATES AND PHOSPHONATES,
AD-600 703 DIV. 14

HYDRAULIC FLUIDS
LUBRICANTS
DEVELOPMENT OF FIRE-RESISTANT, WATERBASED ADDITIVES FOR HYDRAULIC FLUIDS,
AD-600 568 DIV. 14

HYDRAULIC FLUIDS
PREPARATION
FIRE-RESISTANT WATER BASE HYDRAULIC FLUID, PARTIAL ALKYLESTER ALKALI SALTS OF PHOSPHATES AND PHOSPHONATES,
AD-600 703 DIV. 14

HYDRAULIC SERVOMECHANISMS
FEASIBILITY STUDIES
VEHICULAR MOUNT SIMULATOR-ANALYZER: USING A HYDRAULIC SERVOMECHANISM TO SIMULATE THE CHARACTERISTIC OF A SPRING,
AD-600 537 DIV. 22

HYDRAULIC SYSTEMS
SIMULATION
RESEARCH OF HYDRAULIC PULSATION CONCEPTS,
AD-600 663 DIV. 9

HYDROFOILS
FLUID DYNAMIC PROPERTIES
MEASURMENTS OF THE WATER SURFACE CONTOUR BEHIND A HYDROFOIL OF MODERATE ASPECT RATIO,
AD-600 066 DIV. 9
THE EQUILIBRIUM CONFIGURATION OF A TOWED HYDROFOIL-CABLE SYSTEM IN TWO-DIMENSIONAL STEADY TURNS,
AD-600 068 DIV. 9

HYDROGEN
CHEMICAL ANALYSIS
DETECTION OF HYDROGEN ABOARD AEROSPACE FLIGHT VEHICLES,
AD-600 153 DIV. 4

HYDROGEN
INJECTION
LAMINAR BOUNDARY LAYER WITH HYDROGEN INJECTION INCLUDING MULTICOMPONENT DIFFUSION,
AD-600 862 DIV. 9

HYPERSONIC FLIGHT
BLUNT BODIES
TURBULENT DIFFUSION IN THE WAKE OF A BLUNTNOSED BODY AT HYPERSONIC SPEEDS,
AD-600 632 DIV. 9

HYPERSONIC FLIGHT
FLUID FLOW
MATHEMATICAL ANALYSIS OF INVISCID FLOW FIELD BEHIND SPHERE CONES IN HYPERSONIC FLIGHT,
AD-600 630 DIV. 9

HYPERSONIC FLOW
BLUNT BODIES
ASYMPTOTIC FLOW PATTERN OF A HYPERSONIC BODY,
AD-600 540 DIV. 9

HYPERSONIC FLOW
HEAT TRANSFER
HEAT TRANSFER TO FLAT PLATE IN HIGH-TEMPERATURE RAREFIED ULTRA-HIGH MACH NUMBER FLOW,
AD-600 344 DIV. 9
LOW DENSITY EFFECTS ON HEAT TRANSFER IN HYPERSONIC FLIGHT,
AD-600 639 DIV. 25

HYPERSONIC WIND TUNNELS
DESIGN
DESIGN FEATURES OF THE GENERAL ELECTRIC RESEARCH LABORATORY HYPERSONIC SHOCK TUNNEL,
AD-600 345 DIV. 30

HYPERSONIC WIND TUNNELS
HEATERS
FURTHER DEVELOPMENT OF A GRAPHITE HEATER FOR HIGH PRESSURE NITROGEN OPERATION,
AD-600 010 DIV. 20

HYPERVELOCITY PROJECTILES
IMPACT SHOCK
REVIEW AND ANALYSIS OF EXPERIMENTAL DATA APPLICABLE TO THE IMPACT OF HIGH VELOCITY PROJECTILES WITH SEMI-INFINITE METAL TARGETS,
AD-600 668 DIV. 22

HYPOTHERMIA
BLOOD CIRCULATION
VASCULAR RESPONSES DURING HYPOTHERMIA,
AD-600 549 DIV. 16

HYPOTHERMIA
TOLERANCES (PHYSIOLOGY)
TOLERANCE TO PROLONGED DEEP HYPOTHERMIA DURING PERFUSION,
AD-600 594 DIV. 16

ICE
THICKNESS
NORTH AMERICAN ARCTIC AND SUBARCTIC ICE THICKNESS OBSERVATIONS,
AD-600 483 DIV. 2

IDENTIFICATION SYSTEMS
DEFENSE SYSTEMS
INFORMATION SYSTEM FOR IDENTIFICATION AND RAID RECOGNITION IN AIR/SPACE DEFENSE,
AD-600 538 DIV. 6

IMAGE INTENSIFIERS (ELECTRONICS)
PHOTOGRAPHIC IMAGES
CONTRAST MODULATION TECHNIQUES FOR PHOTOGRAPHIC IMAGE ENHANCEMENT,
AD-600 295 DIV. 24

IMMUNITY
ANTIGEN-ANTIBODY REACTIONS
MECHANISM OF ADJUVANT EFFECT OF ENDOTOXINS IN ANTIBODY FORMATION,
AD-600 257 DIV. 16

IMMUNITY
CANCER
IMMUNOLOGICAL, BIOLOGICAL AND CYTOLOGICAL PROPERTIES OF MALIGNANT TUMORS IN HETEROTRANSPLANTATION AND EXPLANTATION,
AD-600 787 DIV. 16

INCOMPRESSIBLE FLOW
BOUNDARY LAYER
ON HYDRODYNAMIC STABILITY OF TWO-DIMENSIONAL UNSTEADY INCOMPRESSIBLE LAMINAR BOUNDARY LAYERS,
AD-600 102 DIV. 9

INCOMPRESSIBLE FLOW
FLUID FLOW
APPROXIMATE CALCULATION OF THE LAMINAR BOUNDARY LAYER IN AN INCOMPRESSIBLE FLUID WITH HEAT TRANSFER AND MASS TRANSFER,
AD-600 183 DIV. 9

INDEXES
AERONAUTICS
OFFICE OF AEROSPACE RESEARCH CUMULATIVE INDEX FOR JANUARY 1959 THROUGH DECEMBER 1962,
AD-600 160 DIV. 30

INDIUM ALLOYS
ANTIMONY ALLOYS
EFFECTS OF PLASTIC DEFORMATION, ANNEALING, AND FATIGUE ON THE ELECTRICAL PROPERTIES OF THE SEMICONDUCTOR INDIUM ANTIMONIDE,
AD-600 256 DIV. 25

INDUSTRIAL EQUIPMENT
DESIGN
PRODUCTION ENGINEERING MEASURE FOR TUBE TYPE 7587,
AD-600 007 DIV. 9

INERTIAL GUIDANCE
SPACECRAFT
WEAPON SYSTEM 107A-1, MARK-3 ADVANCED RE-ENTRY VEHICLE PROGRAM, INERTIAL WHEEL CONTROL,
AD-600 683 DIV. 12

INERTIAL NAVIGATION
INSTRUMENTATION
DEVELOPMENT OF A SYSTEM OF CLASSIFICATION OF INERTIAL NAVIGATION SENSORS THAT WILL AID IN THE PREDICTION OF PERFORMANCE,
AD-600 570 DIV. 19
DEVELOPMENT OF A SYSTEM OF CLASSIFICATION OF INERTIAL NAVIGATION SENSORS THAT WILL AID IN THE PREDICTION OF PERFORMANCE,
AD-600 571 DIV. 19

INERTIAL NAVIGATION
OPTIMIZATION
SETTLING TIME CONSTRAINT FOR OPTIMIZATION OF TRANSIENT PERFORMANCE OF A VELOCITY INERTIAL NAVIGATION SYSTEM,
AD-600 140 DIV. 19

INFECTIOUS HEPATITIS
ETIOLOGY
STUDY OF VIRAL HEPATITIS,
AD-600 512 DIV. 16

INFORMATION RETRIEVAL
GRAPHICS
STUDY OF THE CHAIN-DIFFERENCE CORRELATION TECHNIQUE FOR CONTOUR LINE PATTERNS,
AD-600 274 DIV. 30
STUDY AND EXPERIMENTAL INVESGIGATION OF PATTERN RECOGNITION SYSTEMS SUITABLE FOR GRAPHICAL DATA PROCESSING,
AD-600 331 DIV. 30
COMPUTER PROGRAM FOR THE EXTRACTION OF GRAPHIC DATA FROM DIGITAL COMPUTERS,
AD-600 616 DIV. 30

INFORMATION RETRIEVAL
LEARNING
SOME PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION,
AD-600 047 DIV. 30

INFORMATION RETRIEVAL
MILITARY REQUIREMENTS
DESIGN AND DEVELOPMENT OF A MODULAR DIGITAL COMPUTER SYSTEM TO BE USED IN FUTURE ARMY COMMAND CONTROL INFORMATION SYSTEMS,
AD-600 284 DIV. 30

INFORMATION RETRIEVAL
NETWORKS
PROPOSED BASIC CONFIGURATION FOR A NATIONAL SYSTEM OF INTERLINKING INFORMATION RETRIEVAL NETWORKS MODEL NETWORK,
AD-600 221 DIV. 32

INFORMATION RETRIEVAL
PROGRAMMING LANGUAGES
PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION,
AD-600 113 DIV. 30

INFORMATION RETRIEVAL
SCIENTIFIC RESEARCH
SCIENTIFIC INFORMATION PROBLEMS OF RETRIEVAL, COMMUNICATION, AND DISSEMINATION
AD-600 092 DIV. 30
INFORMATION SCIENCE -GENERAL DISCUSSION AND BIBLIOGRAPHY,
AD-600 110 DIV. 30

INFRARED DETECTORS
PRODUCTION
PRODUCTION ENGINEERING MEASURE FOR TYPE IR-200 LEAD SELENIDE INFRARED DETECTORS,
AD-600 713 DIV. 6

INFRARED FILTERS
REFRACTIVE INDEX
INFRARED COATINGS OF LEAD CHLORIDE, LITHIUM FLUORIDE, AND ZINC TELLURIDE: REFRACTIVE INDEX, REFLECTANCE ENHANCEMENT, AND ADHERENCE TO SUBSTRATES,
AD-600 264 DIV. 25

INFRARED OPTICAL MATERIALS
REFLECTION
INFRARED COATINGS OF LEAD CHLORIDE, LITHIUM FLUORIDE, AND ZINC TELLURIDE: REFRACTIVE INDEX, REFLECTANCE ENHANCEMENT, AND ADHERENCE TO SUBSTRATES,
AD-600 264 DIV. 25

INORGANIC POLYMERS
COMPLEX COMPOUNDS
POLY-(TETRAMETHYL-P-SILPHENYL-ENE) SILOXANES: STAR- AND COMB-TYPE POLYSTYRENES: FORCED OSCILLATION TORSION PENDULUM: NOVEL INORGANIC POLYMERS: IRRADIATED MYLAR,
AD-600 249 DIV. 14

INSTRUCTION MANUALS
ENGINEERING
FACTORS INVOLVED IN RECONNAISSANCE AND POSITIONING FOR A DEEP-OCEAN CONSTRUCTION SITE,
AD-600 305 DIV. 13
INFORMATION ON ENVIRONMENTS, SYSTEMS, AND TECHNIQUES RELATIVE TO CONSTRUCTION IN DEEP OCEAN AREAS,
AD-600 306 DIV. 13
DEEP-OCEAN ENVIRONMENTAL KNOWLEDGE PERTAINING TO OCEANOGRAPHIC DATA,
AD-600 307 DIV. 13

INSTRUCTION MANUALS

NOPP STANDARD TIME FORMULA MW-1 FOR MANUAL ARC WELDING OPERATION TIME STUDIES, AD-600 211 DIV. 26

MACHINE SHOP PRACTICE
TIME STUDIES
NOPP STANDARD TIME FORMULA M.A.D. FOR ASSEMBLY OPERATION TIME STUDIES, AD-600 192 DIV. 26

MACHINE TOOLS
TIME STUDIES
NOPP STANDARD TIME FORMULA REPORT FOR ARTOS WIRE STRIPPING MACHINE, AD-600 191 DIV. 26
NOPP STANDARD TIME FORMULA GR-8 REPORT FOR CENTER LAPPING OPERATION TIME STUDIES, AD-600 193 DIV. 26
NOPP STANDARD TIME FORMULA SM-27 FOR METAL FABRICATOR OPERATION TIME STUDIES, AD-600 199 DIV. 26
NOPP STANDARD TIME FORMULA WS-1 REPORT FOR WALES-STRIPPIT FABRICATOR MOD 10-A, AD-600 210 DIV. 26

MACHINES
WOOD
WOODWORKING MACHINES, AD-600 859 DIV. 26

MAGNESIUM ALLOYS
CORROSION
THE CORROSIVITY OF MAGNESIUM ALLOYS IN 5 AND 20 PERCENT SALT FOG ENVIRONMENTS, AD-600 029 DIV. 17
MASS SPECTROMETRIC DETERMINATION OF THE DISSOCIATION ENERGY OF THE MOLECULES MGO, CAO, SRO AND SR2O, AD-600 442 DIV. 4

MAGNETIC CORE STORAGE
SPECTRUM ANALYZERS
SPECTRUM ANALYZER USING MAGNETIC CORE DIGITAL STORAGE, AD-600 216 DIV. 8

MAGNETIC PROPERTIES
RARE EARTH ELEMENTS
VARIATION OF PERIODICITY OF MAGNETIC STRUCTURE WITH DILUTION AND TEMPERATURE FOR THE HEAVY RARE EARTH METALS, AD-600 772 DIV. 25

MAGNETIC RECORDING SYSTEMS
DATA STORAGE SYSTEMS
DEVELOPMENT OF AN INTERMEDIATE CAPACITY, HIGH-SPEED MAGNETIC FILM MEMORY SYSTEM, AD-600 271 DIV. 30

MAGNETISM
RELAXATION TIME
PARAMAGNETIC RELAXATION IN CRYSTALS, AD-600 089 DIV. 25

MAGNETOHYDRODYNAMICS
ELECTRIC POWER PRODUCTION
INVESTIGATION OF MAGNETICALLY INDUCED IONIZATION OF XENON USING MHD GENERATORS, AD-600 531 DIV. 25

MAGNETOHYDRODYNAMICS
GENERATORS
LARGE-SIGNAL BEHAVIOR OF A PARAMETRIC MAGNETOGASDYNAMIC GENERATOR, AD-600 004 DIV. 25

MAGNETOHYDRODYNAMICS
IONIZATION
NON-EQUILIBRIUM IONIZATION AND MAGNETOHYDRODYNAMIC PHENOMENA, AD-600 526 DIV. 25

MAGNETRONS
ELECTRON TUBES
AXIALLY EXTENDED INTERACTION AREA INVERTED COAXIAL MAGNETRON, AD-600 722 DIV. 8

MAGNETRONS
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE FOR VOLTAGE TUNABLE MAGNETRONS, AD-600 094 DIV. 8

MAGNETRONS
MICROWAVE EQUIPMENT
AXIALLY EXTENDED INTERACTION AREA INVERTED COAXIAL MAGNETRON, AD-600 722 DIV. 8

MAGNETRONS
PERFORMANCE (ENGINEERING)
COMPARATIVE ENGINEERING EVALUATION TEST OF THE SJ26 MAGNETRON AND THE SJ26 MODIFIED MAGNETRON, AD-600 262 DIV. 8

MALAYA
VISIBILITY
STUDY OF VISIBILITY CONDITIONS IN MALAYA AND VARIOUS ASPECTS OF PHYSICAL GEOGRAPHY AND METEOROLOGY, AD-600 712 DIV. 2

MANAGEMENT CONTROL SYSTEMS
COSTS
INTRODUCTION TO THE PERT COST SYSTEM, AD-600 184 DIV. 26

MANGANESE COMPOUNDS
PYROLYSIS
THERMAL DECOMPOSITION KINETICS OF MANGANESE CYCLOPENTADIENYL TRICARBONYL AND MOLYBDENUM CARBONYL, AD-600 814 DIV. 4

MANOMETERS
INSTRUMENTATION
RECORDER OF PRESSURE PULSATIONS AND THEIR FREQUENCIES IN LIQUID AND GAS FLOWS, AD-600 779 DIV. 30

MANUFACTURING METHODS
TETRODES
PRODUCTION TECHNIQUES FOR ASSEMBLING AND TESTING THE Z-5267 CERAMIC TETRODE, AD-600 384 DIV. 8

MAPPING
COMPILERS
OPTIMIZATION OF A DIGITAL AUTOMATIC MAP COMPILATION SYSTEM, AD-600 117 DIV. 30

MAPPING
RADAR
IMAGE DESIGN FOR TERRAIN-MAPPING RADAR SYSTEMS, AD-600 084 DIV. 8

MAPS
REPRODUCTION
EVALUATION AND TEST OF A SINGLE COLOR ELECTROSTATIC PRINTING MACHINE FOR THE REPRODUCTION OF TOPOGRAPHIC MAPS AND CHARTS, AD-600 241 DIV. 2

MARAGING STEEL
MECHANICAL PROPERTIES
MARAGING STEELS, WITH 18 PER CENT NICKEL ALLOYS, MECHANICAL PROPERTIES, AD-600 427 DIV. 17

MARAGING STEELS
FRACTURE (MECHANICS)
INVESTIGATION OF LOW-CYCLE FATIGUE FAILURES IN LADISH D6A-C STEEL, 6AL-4V TITANIUM AND 18NI(300) MARAGING STEEL BY APPLIED FRACTURE MECHANICS, AD-600 375 DIV. 17

MARINE BIOLOGY
MAN AND THE SEA, AD-600 870 DIV. 16

MARINE BIOLOGY
OCEANOLOGY
TRANSACTIONS OF THE MURMANSK MARINE BIOLOGICAL INSTITUTE, AD-600 039 DIV. 2

MARTENSITE
INTERNAL FRICTION
SURVEY OF LITERATURE DEALING WITH THE INTERNAL FRICTION OF MARTENSITE, AD-600 848 DIV. 17

MARTENSITE
MECHANICAL PROPERTIES
EFFECTS OF COLD-DRAWING ON THE MECHANICAL PROPERTIES OF STEEL RODS, AD-600 404 DIV. 17

MASS SPECTROSCOPY
DISPLAY SYSTEMS
OSCILLOSCOPES EQUIPPED WITH POLAROID LAND CAMERAS FOR RECORDING RAPID CHANGES IN MASS SPECTRA, AD-600 138 DIV. 25

MASS SPECTROSCOPY
GAS IONIZATION
MASS SPECTROMETER STUDIES OF IONIZATION PROCESSES IN NITROGEN, AD-600 311 DIV. 25

MASS SPECTROSCOPY
SOLIDS
FLASH VAPORIZATION OF SOLID MATERIALS FOR MASS SPECTROMETRY BY XENON FLASHTUBE, AD-600 159 DIV. 25

MATERIAL CONTROL
NAVAL EQUIPMENT
SURVEY OF INFORMATION REQUIREMENTS FOR NAVY MAINTENANCE AND MATERIAL MANAGEMENTS, AD-600 450 DIV. 18

MATERIAL FORMING
METALS
RESEARCH ON U. S. GOVERNMENT METALWORKING PROCESSES AND EQUIPMENT WITH EMPHASIS ON REFRACTORY METALS, BERYLLIUM, SUPERALLOYS, AND HIGH-STRENGTH STEELS, AD-600 088 DIV. 17

MATERIAL FORMING
TIME STUDIES
NOPP STANDARD TIME FORMULA PF-1 REPORT FOR PIPE FABRICATING, AD-600 203 DIV. 26

MATERIALS
PRESERVATION
DETERIORATION OF MATERIALS IN STORAGE AND RECOMMENDED STORAGE CONDITIONS, AD-600 560 DIV. 18
BIBLIOGRAPHY ON PRESERVATION OF INACTIVE EQUIPMENT AND LONG-TERM STORAGE OF MATERIALS, AD-600 642 DIV. 18

MATERIALS
PROCESSING
MATERIAL PROCESSING AND PHENOMENA INVESTIGATIONS FOR FUNCTIONAL ELECTRONICS BLOCKS, AD-600 353 DIV. 8

MATHEMATICAL MODELS
CUMULUS CLOUDS
SIMPLIFIED MODEL FOR THE FORMATION, MOVEMENT, AND DISSIPATION OF FAIR WEATHER CUMULUS CLOUDS, AD-600 835 DIV. 2

MATHEMATICAL MODELS
VISUAL PERCEPTION
STUDIES OF MATHEMATICAL MODELS OF VISUAL PERFORMANCE CAPABILITY, AD-600 858 DIV. 28

MATHEMATICAL PREDICTION
GAMMA-RAY SPECTRA
PENETRATION OF PLANE NORMAL GAMMA RAYS THROUGH SLABS OF ALUMINUM AND STEEL, III PROCESSED NUMERICAL DATA, AD-600 392 DIV. 20

MATHEMATICAL PREDICTION
STOCK LEVEL CONTROL
EXPONENTIAL SMOOTHING METHODS FOR PREDICTING THE DEMAND FOR SPARE PARTS, AD-600 239 DIV. 18

MATRIX ALGEBRA
DATA PROCESSING SYSTEMS
OPTICAL PROCESSING SYSTEM USING THERMOPLASTIC AND OIL FILM TECHNIQUES FOR STOCHASTIC MATRIX STORAGE, AD-600 379 DIV. 30

MATRIX ALGEBRA
NUMERICAL METHODS AND PROCEDURES
MATRIX REPRESENTATION OF MULTI-LOADED CIRCULAR LOOP ANTENNAS, AD-600 960 DIV. 8

MATRIX ALGEBRA
THEOREMS
BOUNDS FOR THE RANK OF THE SUM OF TWO MATRICES, AD-600 471 DIV. 15

MEASURING DEVICES (ELECTRICAL + ELECT
VOID FRACTION MEASUREMENT, WITH PARTICULAR ATTENTION GIVEN TO THE RADIOACTIVE PARTICLE ATTENUATION TECHNIQUES, AD-600 574 DIV. 9

MEASURING DEVICES (ELECTRICAL + ELEC
BIOPHYSICS
ELECTRICAL MEASUREMENT BY TRANSDUCERS OF MECHANICAL QUANTITIES IN PHYSIOLOGICAL INVESTIGATIONS, AD-600 613 DIV. 16

MEASURING DEVICES (ELECTRICAL + ELEC
DESIGN
THE LOCAL METHOD FOR DIRECT MEASUREMENT OF THE BOUNDARY-LAYER VELOCITY PROFILE OF A NONUNIFORMLY HEATED FLAT PLATE, AD-600 609 DIV. 9

MEASURING DEVICES (ELECTRICAL + ELEC
SAFETY DEVICES
UTILIZATION OF ELECTRONIC MEASURING EQUIPMENT IN INDUSTRIAL SAFETY, AD-600 581 DIV. 16

MECHANICS
PERTURBATION THEORY
THEOREM OF A. N. KOLMOGOROV CONCERNING THE CONSERVATION OF CONDITIONALLY PERIODIC MOTIONS WITH SMALL CHANGE OF THE HAMILTONIAN FUNCTION, AD-600 136 DIV. 25

MEDICAL EQUIPMENT
ANESTHESIA
APPARATUS FOR ELECTRONARCOSIS, AD-600 147 DIV. 16

MEDICAL EQUIPMENT
BLOOD PRESSURE
INSTRUMENT FOR RECORDING

LASERS
RADAR
COHERENT OPTICAL RADAR PARAMETERS AND TARGET REFLECTIONS,
AD-600 272 DIV. 6
ULTRAVIOLET ABSORPTION SPECTRA OF RUBY-APPLICATION TO LASERS,
AD-600 293 DIV. 25

LASERS
SCIENTIFIC RESEARCH
LASERS! A SURVEY OF RUSSIAN LITERATURE FROM 1956 TO 1964,
AD-600 291 DIV. 25
NOPF STANDARD TIME FORMULA VTL-1 REPORT FOR VERTICAL TURRET LATHE,
AD-600 208 DIV. 26
NOPF STANDARD TIME FORMULA TL-1 REPORT FOR W AND S NO. 3 TURRET LATHE,
AD-600 209 DIV. 26

LAUNCHING SITES
NAVAL VESSELS (COMBATANT)
MISSILE LAUNCHING ZONE ABOARD TMF FRENCH SHIP E. E. DU CHAYLA,
AD-600 426 DIV. 12

LEADERSHIP
PSYCHOMETRICS
VALUES ASSOCIATED WITH MILITARY CAREER MOTIVATION,
AD-600 037 DIV. 28
PREDICTION OF OFFICER PERFORMANCE,
AD-600 038 DIV. 28

LEARNING
ATTITUDES
LEARNING OF BALANCED AND UNBALANCED SOCIAL STRUCTURES,
AD-600 106 DIV. 28

LEARNING
MEMORY
INFORMATION ASSIMILATION FROM SYMBOLIC DISPLAYS, AMOUNT OF INFORMATION PRESENTED AND REMOVED,
AD-600 036 DIV. 28

LEARNING
PERFORMANCE TESTS
ISOLATION EFFECTS WHEN PAIRED-ASSOCIATES ARE PRESENTED SERIALLY,
AD-600 648 DIV. 28
SERIAL POSITION AS A CUE IN LEARNING! THE EFFECT OF TEST-RATE,
AD-600 649 DIV. 28

LEARNING
PSYCHOMETRICS
REPLICATION OF PAIRED-ASSOCIATE LEARNING AS A FUNCTION OF S-R SIMILARITY,
AD-600 646 DIV. 28

LEARNING
TEST METHODS
DELAY OF SELF-TESTING IN THREE TYPES OF PROGRAMED TEXT,
AD-600 697 DIV. 23

LEAST SQUARES METHOD
WEST COAST LINEARITY RUN TO DETERMINE CALIBRATION FACTOR OF LACOSTE-ROMBERG GRAVITY METER S-9,
AD-600 388 DIV. 2

LENSES
PRODUCTION
ASPHERIC OPTICAL ELEMENTS PROGRAM -PRODUCTION AND MANUFACTURING METHODS,
AD-600 006 DIV. 24

LIFE SUPPORT
ABSTRACTS
SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS, PT. A, BIOSCIENCES; COMPILATION OF ABSTRACTS,
AD-600 129 DIV. 16

LIFT
DISTRIBUTION
AN ASYMPTOTIC METHOD FOR DETERMINING THE LIFT DISTRIBUTION OF A SWEPT-BACK WING OF FINITE SPAN,
AD-600 422 DIV. 9

LIGHT
DEMODULATION
SOLID-STATE TECHNIQUES FOR MODULATION AND DEMODULATION OF OPTICAL WAVES,
AD-600 419 DIV. 25

LIGHT
MODULATION
SOLID-STATE TECHNIQUES FOR MODULATION AND DEMODULATION OF OPTICAL WAVES,
AD-600 419 DIV. 25
MODULATION OF THE LINEAR-OPTIC EFFECT AT MICROWAVE FREQUENCIES,
AD-600 461 DIV. 8

LIGHT GAS GUNS
PERFORMANCE (ENGINEERING)
A COMPARISON OF SHOCK AND ISENTROPIC HEATING ON LIGHT-GAS GUN COMPRESSION,
AD-600 341 DIV. 22

LIGHT PULSES
MEASUREMENT
PULSE-LAMP-PARAMETER DETERMINATION BY OBSERVATION OF NONLINEAR OPTICAL PHENOMENA,
AD-600 582 DIV. 7

LIGHT PULSES
REFLECTION
COHERENT OPTICAL RADAR PARAMETERS AND TARGET REFLECTIONS,
AD-600 272 DIV. 6

LIGHTING EQUIPMENT
RUNWAYS
EVALUATION OF AIRFIELD TAXIWAY CENTERLINE LIGHTING FOR LOW VISIBILITY OPERATIONS,
AD-600 775 DIV. 1

LIMITERS
RADIOFREQUENCY POWER
SEMICONDUCTOR SWITCHING AND LIMITING USING 3 DB SHORT SLOT (HYBRID) COUPLERS,
AD-600 028 DIV. 8

LINEAR SYSTEMS
CONTROL SYSTEMS
THE REPRESENTATION PROBLEM FOR A GENERAL LINEAR DYNAMIC SYSTEM,
AD-600 055 DIV. 15

LINEAR SYSTEMS
MATHEMATICAL MODELS
A CLASS OF ESTIMATES IN LINEAR MODELS WITH SEVERAL OBSERVATIONS PER CELL,
AD-600 278 DIV. 15

LINEAR SYSTEMS
NOISE
PARAMETER ESTIMATION IN NOISY SYSTEMS,
AD-600 174 DIV. 8

LIPIDS
ABSORPTION (BIOLOGICAL)
EFFECT OF LIPASE INGESTION ON BLOOD LIPID LEVELS,
AD-600 533 DIV. 16

LIQUID JETS
HIGH-PRESSURE RESEARCH
A HYDROPNEUMATIC METHOD OF LIQUID JET BLOWOUT UNDER HIGH PRESSURE,
AD-600 817 DIV. 9

LIQUID METAL PUMPS
SPACE STATIONS
INERTIA PUMPS FOR LIQUID TRANSFER TO AND FROM ORBITING SPACE STATIONS,
AD-600 756 DIV. 27

LIQUID ROCKET PROPELLANTS
REVIEWS
SOVIET REVIEW OF PROPELLANT APPLICATION IN LIQUID-PROPELLANT ROCKETS,
AD-600 523 DIV. 10

LIQUID ROCKET PROPELLANTS
SENSITIVITY
MECHANISM OF EXPLOSION INITIATIONS IN THE STANDARD IMPACT SENSITIVITY TESTER,
AD-600 603 DIV. 10

LITHIUM COMPOUNDS
FLUORIDES
INHIBITED DISSOLUTION RATES OF (100) SURFACES OF SINGLE CRYSTALS OF LITHIUM FLUORIDE-TECHNIQUE FOR DETERMINATION,
AD-600 328 DIV. 25

LITHOSPHERE
ELECTRICAL PROPERTIES
INVESTIGATIONS OF ELECTRICAL CHARACTERISTICS OF ROCK MEDIA SURROUNDING DRILL HOLES IN NEW YORK STATE,
AD-600 758 DIV. 2

LIVER
LYMPH
ROLE OF BILE IN FORMATION OF HEPATIC LYMPH,
AD-600 323 DIV. 16

LIVER
RADIATION EFFECTS
EFFECT OF IONIZING RADIATION ON REGENERATED LIVER OF WHITE MICE FOLLOWING BRIEF AND CHRONIC IRRADIATION,
AD-600 606 DIV. 16

LOADING (MECHANICS)
SAND
STATIC AND DYNAMIC SHEAR STRENGTH TEST OF DRY SAND,
AD-600 356 DIV. 7

LOADING (MECHANICS)
VEHICLES
DESIGN CRITERIA FOR GROUND INDUCED DYNAMIC LOADS FOR VEHICLES OPERATING ON PREPARED SURFACES,
AD-600 867 DIV. 30

LOGISTICS
MANAGEMENT CONTROL SYSTEMS
SURVEY OF INFORMATION REQUIREMENTS FOR NAVY MAINTENANCE AND MATERIAL MANAGEMENTS,
AD-600 430 DIV. 15

LOOP ANTENNAS
ADMITTANCE
ADMITTANCE OF BARE CIRCULAR LOOP ANTENNAS IN A DISSIPATIVE MEDIUM,
AD-600 539 DIV. 8

LOOP ANTENNAS
ANTENNA RADIATION PATTERNS
NEW VOR COUNTERPOISE SYSTEM FOR REDUCTION OF SITING ERRORS,
AD-600 362 DIV. 8

LOOP ANTENNAS
PERFORMANCE (ENGINEERING)
MATRIX REPRESENTATION OF MULTI-LOADED CIRCULAR LOOP ANTENNAS,
AD-600 460 DIV. 8

LOOP ANTENNAS
TRANSIENTS
EXPERIMENTAL INVESTIGATIONS ON THE TRANSIENT RESPONSE CHARACTERISTICS OF RECTANGULAR LOOP ANTENNAS,
AD-600 797 DIV. 8

LOOP ANTENNAS
WAVE TRANSMISSION
RECEPTION AND TRANSMISSION OF TRANSIENT ELECTROMAGNETIC FIELDS,
AD-600 835 DIV. 25

LORAN
NAVIGATION AIDS
HIGH-ACCURACY FREQUENCY STANDARDS IN AERIAL NAVIGATION -PRECISE CLOCKS,
AD-600 107 DIV. 19

LOW-TEMPERATURE RESEARCH
SCIENTIFIC RESEARCH
SUMMARY OF RESEARCH ON NUCLEAR MAGNETIC RESONANCE, ATOMIC SPECTROSCOPY, LOW-TEMPERATURE PHENOMENA, AND NUCLEAR STRUCTURE,
AD-600 874 DIV. 20

LUBRICANT ADDITIVES
GLYCOLS
DEVELOPMENT OF FIRE-RESISTANT, WATERBASED ADDITIVES FOR HYDRAULIC FLUIDS,
AD-600 568 DIV. 14

LUBRICANTS
MINERAL OILS
EFFECT OF BREMSSTRAHLUNG OF A 25 MEV BETATRON AND ULTRAVIOLET RAYS ON MINERAL LUBRICATING OILS,
AD-600 584 DIV. 14

LUMINESCENCE
EXCITATION
ABSOLUTE QUANTUM EFFICIENCY OF SODIUM SALICYLATE BY EXTREME ULTRAVIOLET LIGHT,
AD-600 322 DIV. 25

LYMPH
LIVER
ROLE OF BILE IN FORMATION OF HEPATIC LYMPH,
AD-600 323 DIV. 16

MACHINE SHOP PRACTICE
OPERATION
NOPF STANDARD TIME FORMULA FOR ANODIZE OPERATION TIME STUDIES,
AD-600 140 DIV. 26

MACHINE SHOP PRACTICE
ORDNANCE
NOPF STANDARD TIME FORMULA GR-8 REPORT FOR CENTER LAPPING OPERATION TIME STUDIES,
AD-600 193 DIV. 26
NOPF STANDARD TIME FORMULA GR-5 REPORT FOR CENTERLESS GRINDER OPERATION TIME STUDIES,
AD-600 194 DIV. 26
NOPF STANDARD TIME FORMULA F-1 FOR JIG OPERATION TIME STUDIES,
AD-600 196 DIV. 26
NOPF STANDARD TIME FORMULA GR-2 FOR INTERNAL GRINDING OPERATION TIME STUDIES,
AD-600 197 DIV. 26
NOPF STANDARD TIME FORMULA GRH FOR MATTISON SURFACE GRINDER OPERATION TIME STUDIES,
AD-600 198 DIV. 26
NOPF STANDARD TIME FORMULA SM-27 FOR METAL FABRICATOR OPERATION TIME STUDIES,
AD-600 199 DIV. 26
NOPF STANDARD TIME FORMULA M-1 REPORT FOR MILLING MACHINE OPERATION TIME STUDIES,
AD-600 200 DIV. 26
NOPF STANDARD TIME FORMULA M-3 REPORT FOR MILLING MACHINE OPERATION TIME STUDIES,
AD-600 201 DIV. 26

WEAPONS,
AD-600 527 DIV, 18

MILITARY TRAINING
NAVIGATION
ADVANCED LAND NAVIGATION, PROTOTYPE PROGRAM OF INSTRUCTION OF ENLISTED MEN TO NAVIGATE ACCURATELY OVER DIFFICULT UNFAMILIAR TERRAIN UNDER ALL CONDITIONS OF VISIBILITY,
AD-600 749 DIV, 23

MILLIMETER WAVES
NOISE GENERATORS
NOISE SOURCE FOR MILLIMETER WAVELENGTH,
AD-600 246 DIV, 8

MILLING MACHINES
CONTROL SYSTEMS
DEVELOPMENT OF ADAPTIVE CONTROL TECHNIQUES FOR NUMERICALLY-CONTROLLED MILLING MACHINES, BENDIX RESEARCH DYNA-PATH 20 CONTINUOUS-PATH NUMERICAL CONTROL SYSTEM MODIFIED FOR USE WITH ADAPTIVE CONTROLLER,
AD-600 330 DIV, 26

MILLING MACHINES
TIME STUDIES
NOPF STANDARD TIME FORMULA M-1 REPORT FOR MILLING MACHINE OPERATION TIME STUDIES,
AD-600 200 DIV, 26
NOPF STANDARD TIME FORMULA M-3 REPORT FOR MILLING MACHINE OPERATION TIME STUDIES,
AD-600 201 DIV, 26
NOPF STANDARD TIME FORMULA M-6 REPORT FOR MILWAUKEE SIMPLEX MILL,
AD-600 202 DIV, 26
NOPF STANDARD TIME FORMULA M-4 REPORT FOR SPLINE MILL,
AD-600 206 DIV, 26
NOPF STANDARD TIME FORMULA M-5 REPORT FOR THREAD MILLING,
AD-600 207 DIV, 26

MINERAL OILS
ELECTRIC INSULATION
EFFECT OF BREMSSTRAHLUNG OF A 25 MEV BETATRON AND ULTRAVIOLET RAYS ON MINERAL LUBRICATING OILS,
AD-600 584 DIV, 14

MINERAL OILS
RADIATION CHEMISTRY
EFFECT OF BREMSSTRAHLUNG OF A 25 MEV BETATRON AND ULTRAVIOLET RAYS ON MINERAL LUBRICATING OILS,
AD-600 584 DIV, 14

MINERALS
EQUATIONS OF STATE
EQUATIONS OF STATE FOR SOLID BODIES (METALS AND IONIC, VALENT, AND MOLECULAR CRYSTALS),
AD-600 614 DIV, 25

MINIATURE ELECTRON TUBES
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE FOR TUBE TYPE 7587,
AD-600 007 DIV, 9

MINIATURE ELECTRONIC EQUIPMENT
CIRCUITS
FEASIBILITY MODEL OF A MICROMINIATURE VLF/LF FREQUENCY SYNTHESIZER,
AD-600 666 DIV, 8

MINIATURE ELECTRONIC EQUIPMENT
MANUFACTURING METHODS
MATERIAL PROCESSING AND PHENOMENA INVESTIGATIONS FOR FUNCTIONAL ELECTRONICS BLOCKS,
AD-600 355 DIV, 8

MIXERS (ELECTRONICS)
DIODES (SEMICONDUCTOR)
THEORETICALLY AND EXPERIMENTALLY EVALUATING TUNNEL DIODES AND POINT CONTACT DIODES FOR USE AS MIXERS AT 3.2 MILLIMETERS,
AD-600 769 DIV, 8

MODEL BASINS
WATER WAVES
SIMULATION OF IRREGULAR LONG-CRESTED (GAUSSIAN) SEAWAYS,
AD-600 238 DIV, 30

MODEL TESTS
HULLS (MARINE)
MODEL TESTS OF A TUNNEL-BOTTOM 36-FOOT RIVER PATROL CRAFT,
AD-600 690 DIV, 31

MODELS (SIMULATIONS)
SPEECH
SUMMARY OF RESEARCH ON SPEECH ANALYSIS AND SYNTHESIS,
AD-600 433 DIV, 14

MODULATORS
BATTERY CHARGERS
PORTABLE BATTERY CHARGERS,
AD-600 044 DIV, 9

MODULES (ELECTRONICS)
DESIGN
DESIGN AND DEVELOPMENT OF INDICATOR MODULE MOD 2 AND INTEGRATED MODULAR PROGRAMMER,
AD-600 212 DIV, 8

MODULES (ELECTRONICS)
POWER SUPPLIES
INFORMATION THEORETIC EVALUATION AND OPTIMIZATION OF ANTENNA SYSTEMS,
AD-600 365 DIV, 7

MODULES (ELECTRONICS)
DESIGN
DESIGN AND DEVELOPMENT OF INDICATOR MODULE MOD 2 AND INTEGRATED MODULAR PROGRAMMER,
AD-600 213 DIV, 8

MOISTURE
SHELTERS
MOISTURE IN SURVIVAL SHELTERS -METHODS FOR ELIMINATION,
AD-600 423 DIV, 4
MOISTURE IN SURVIVAL SHELTERS -CONTROL OF,
AD-600 437 DIV, 4

MOISTUREPROOFING
FILMS
RAIN REPELLENT,
AD-600 175 DIV, 14

MOLECULAR ELECTRONICS
PHOTOENGRAVING
HIGH RESOLUTION RAPIDLY PROGRAMMABLE MASKING FOR FUNCTIONAL ELECTRONIC BLOCKS,
AD-600 714 DIV, 29

MOLECULAR PROPERTIES
TRANSPORT PROPERTIES
QUANTUM CORRECTIONS TO THE TRANSPORT CROSSSECTIONS,
AD-600 071 DIV, 4

MOLECULAR SPECTROSCOPY
POLYATOMIC MOLECULES
BASIC CONCEPTS IN THE ELECTRONIC SPECTRA OF POLYATOMIC MOLECULES,
AD-600 148 DIV, 4

MOLYBDENUM ALLOYS
MECHANICAL PROPERTIES
MECHANICAL AND PHYSICAL PROPERTIES OF TZM MOLYBDENUM ALLOY SHEET AND TUNGSTEN SHEET PRODUCED IN PHASE I OF THE REFRACTORY METAL SHEET ROLLING PROGRAM,
AD-600 281 DIV, 17

MOLYBDENUM COMPOUNDS
PYROLYSIS
THERMAL DECOMPOSITION KINETICS OF MANGANESE CYCLOPENTADIENYL TRICARBONYL AND MOLYBDENUM CARBONYL,
AD-600 816 DIV, 4

MONITORS
ATTITUDE CONTROL SYSTEMS
INVESTIGATION OF A LASER/INTERFEROMETER INERTIAL PLATFORM ATTITUDE MONITORING DEVICE,
AD-600 730 DIV, 1

MOON
THEORY
OBSERVATIONS OF THE MOON BASED ON LASER OPTICS AND RADAR ASTRONOMY,
AD-600 508 DIV, 2

MOTIVATION
PERSONALITY
DIFFERENTIAL RESPONSE TO APPRAISAL AND GOAL SETTING AS A FUNCTION OF SELF, GROUP INTERACTION, AND TASK ORIENTATION,
AD-600 296 DIV, 28

MULTIPLE BEAM ANTENNAS
DIRECTION FINDING
ERROR ANALYSIS OF PHASED-ARRAY DIRECTION FINDERS USING MULTIPLE BEAMS,
AD-600 429 DIV, 6

MUSCLES
MOTOR REACTIONS
RESEARCH ON ELBOR PROSTHETICS, HUMAN TRACKING SENSORY MOTOR CONTROL, AND MYOELECTRIC CONTROL,
AD-600 333 DIV, 16

MUTATIONS
CHROMOSOMES
CHANGES IN CHROMOSOMES OF SPORES OF TRANDESCANTIA PALUDOSA WHICH WERE PUT ON VOSTOK 3 AND 4 ARE SUMMARIZED,
AD-600 802 DIV, 16

NAVAL VESSELS (COMBATANT)
GUIDED MISSILE LAUNCHERS
MISSILE LAUNCHING ZONE ABOARD THE FRENCH SHIP E, E, DU CHAYLA,
AD-600 426 DIV, 12

NAVIGATION
ANALOG SYSTEMS
IMPROVEMENT OF SENSOR RESPONSE BY AN ANALOG TECHNIQUE,
AD-600 141 DIV, 19

NAVIGATION
TERRAIN
ADVANCED LAND NAVIGATION, PROTOTYPE PROGRAM OF INSTRUCTION OF ENLISTED MEN TO NAVIGATE ACCURATELY OVER DIFFICULT UNFAMILIAR TERRAIN UNDER ALL CONDITIONS OF VISIBILITY,
AD-600 749 DIV, 23

NAVIGATIONAL AIDS
AIR TRAFFIC CONTROLLERS
INVESTIGATION OF AIR TRAFFIC CONTROLLER JOB AIDS FOR THE AN/TSQ-47 SYSTEM,
AD-600 774 DIV, 5

NAVIGATIONAL LIGHTS
RUNWAYS
EVALUATION OF AIRFIELD TAXIWAY CENTERLINE LIGHTING FOR LOW VISIBILITY OPERATIONS,
AD-600 775 DIV, 1

NEBULAE
GASES
THE DISTRIBUTION OF GASES IN THE PROTOPLANETARY NEBULA,
AD-600 023 DIV, 2

NERVOUS SYSTEM
BAROMETRIC PRESSURE
NEUROLOGIC ASPECTS OF HIGH BAROMETRIC PRESSURE PHENOMENA AND THE EFFECT OF ATMOSPHERIC CONTAMINANTS UPON NERVOUS SYSTEM ACTIVITY,
AD-600 259 DIV, 16

NEUROLOGY
CYBERNETICS
NEUROCYBERNETICS CONFERENCE AT ROSTOV STATE UNIVERSITY IN USSR,
AD-600 624 DIV, 16

NEUROMUSCULAR TRANSMISSION
DRUGS
RESEARCH ON DRUGS ON NEURONAL TRANSMISSION,
AD-600 227 DIV, 16

NEUTRON DETECTORS
CALIBRATION
CALIBRATION OF A GM NUCLEAR DETECTOR,
AD-600 358 DIV, 20

NEUTRON DETECTORS
SILICON
BORON, LITHIUM, OR URANIUM COVERED SILICON THERMAL NEUTRON DETECTORS,
AD-600 583 DIV, 20

NEUTRON FLUX
MEASUREMENT
NEUTRON FLUX MEASUREMENTS ANNOTATED BIBLIOGRAPHY,
AD-600 707 DIV, 20

NEUTRON REACTIONS
NUCLEAR SHELL MODELS
SEMI-EMPIRICAL STUDY OF THE SHELL MODEL PROTON-NEUTRON INTERACTION,
AD-600 698 DIV, 20

NEUTRON SCATTERING
ALBEDO
SEMIEMPIRICAL FORMULA FOR DIFFERENTIAL DOSE ALBEDO FOR NEUTRONS ON CONCRETE,
AD-600 684 DIV, 20

NEUTRONS
ATTENUATION
THE USE OF THE HELIUM 3 SPECTROMETER IN NEUTRON ATTENUATION MEASUREMENTS,
AD-600 037 DIV, 20

NEUTRONS
RADIATION EFFECTS
A LITERATURE SURVEY,
AD-600 765 DIV, 16

NEUTRONS
RADIOLOGICAL DOSAGE
MEASUREMENT OF TISSUE DOSE CONTRIBUTION OF THERMAL, INTERMEDIATE, AND FAST NEUTRONS WITH THE SOVIET NUS-SERIES DOSIMETERS,
AD-600 135 DIV, 20

NEW YORK
GEOPHYSICS
INVESTIGATIONS OF ELECTRICAL CHARACTERISTICS OF ROCK MEDIA SURROUNDING DRILL HOLES IN NEW YORK STATE,
AD-600 758 DIV, 2

NICKEL ALLOYS
AGING (MATERIALS)
MANAGING STEELS, WITH 18 PER CENT NICKEL ALLOYS, MECHANICAL PROPERTIES,
AD-600 927 DIV, 17

THE PULSE WAVES AND DETERMINING THE BLOOD PRESSURE IN ANIMALS, AD-600 148 DIV. 14

MEDICAL EQUIPMENT
BLOOD PULSE
INSTRUMENT FOR RECORDING THE PULSE WAVES AND DETERMINING THE BLOOD PRESSURE IN ANIMALS, AD-600 148 DIV. 14

MEDICAL SUPPLIES
RESCUE KITS
PARARESCUE MEDICAL KIT, AD-600 548 DIV. 14

MELTING
VACUUM APPARATUS
STATISTICAL ANALYSIS EVALUATION OF MELTING AND TRANSVERSE PROPERTIES OF HIGH-STRENGTH (H-11 TYPE) STEEL, AD-600 150 DIV. 17

MEMBRANES
ELASTICITY
FINITE INDENTATION OF AN ELASTIC MEMBRANE BY A SPHERICAL INDENTER, AD-600 743 DIV. 25

MEMBRANES
STIMULATION
GENESIS OF ACTION POTENTIAL IN EXCITABLE TISSUES, AD-600 343 DIV. 14

MEMORY
PSYCHOMETRICS
INFORMATION ASSIMILATION FROM SYMBOLIC DISPLAYS, AMOUNT OF INFORMATION PRESENTED AND REMOVED, AD-600 036 DIV. 28

METAL COATINGS
OXIDATION
METAL COATINGS TO PROTECT NIOBIUM ALLOYS FROM OXIDATION, AD-600 391 DIV. 17

METAL FILMS
ELECTRICAL CONDUCTANCE
MEAN FREE PATH AND BOUNDARY INFLUENCES IN THE METALLIC FIELD EFFECT, AD-600 681 DIV. 25

METAL PLATES
MECHANICAL PROPERTIES
BASE-METAL EVALUATION OF A PRODUCTION ELECTRIC-FURNACE HEAT OF 9NI-CR-MO-V STEEL, AD-600 793 DIV. 17

METALLIC COMPOUNDS
HEAT OF FORMATION
HEATS OF FORMATION OF METALLIC BORIDES, IN PARTICULAR, AL AND ZR BORIDES, BY FLUORINE BOMB CALORIMETRY, AD-600 396 DIV. 4

METALLIC CRYSTALS
ACOUSTIC PROPERTIES
ACOUSTIC EMISSION IN GOLD SINGLE CRYSTALS UNDER APPLIED STRESS: ROLE OF THE SURFACE AND SURFACE FILMS, AD-600 233 DIV. 25

METALLURGY
TUNGSTEN ALLOYS
DEVELOPMENT AND EVALUATION OF TUNGSTEN-BASE ALLOYS PREPARED BY THE VACUUM-ARC-CASTING PROCESS, AD-600 086 DIV. 17

METALORGANIC COMPOUNDS
POLYMERS
STUDIES IN THE FIELD OF COORDINATION CHAIN POLYMERS VII. COORDINATIO POLYMERS BASED ON QUINIZARIN AND 4, 4'-BIS-(ACETOACETYL)-DIPHENYL ETHER, AD-600 085 DIV. 4

METALS
CORROSION
CORROSION AND PROTECTION OF METAL STRUCTURAL MATERIALS AND ALLOYS -COLLECTION OF ARTICLES, AD-600 784 DIV. 17

METALS
DEFORMATION
ULTRASONIC EFFECTS ON DEFORMATION CHARACTERISTICS OF METALS, AD-600 383 DIV. 17

METALS
EQUATIONS OF STATE
EQUATIONS OF STATE FOR SOLID BODIES (METALS AND IONIC, VALENT, AND MOLECULAR CRYSTALS), AD-600 614 DIV. 25

METALS
FATIGUE (MECHANICS)
NONDESTRUCTIVE EVALUATION OF METAL FATIGUE MAGNETIC INSPECTION OF STRESS CYCLED ROD-TYPE SPECIMENS, AD-600 277 DIV. 17

METALS
PHOTOELECTRIC EFFECT
PHOTOELECTRIC EFFECT IN COLLOIDAL METAL PARTICLES, AD-600 226 DIV. 25

METALS
SURFACE PROPERTIES
ON TESTING MATERIALS FOR CAVITATION DAMAGE RESISTANCE, AD-600 016 DIV. 4

METALS
THICKNESS
AIRCRAFT INTERIOR MATERIALS TESTING FOR FLAMMABILITY AND SMOKE CHARACTERISTICS, AD-600 387 DIV. 1

METEOROLOGICAL INSTRUMENTS
DESIGN
PROTOTYPE DEVELOPMENT FOR METEOROLOGICAL INSTRUMENTS, AD-600 836 DIV. 2

METEOROLOGICAL PARAMETERS
MATHEMATICAL MODELS
SIMPLIFIED MODEL FOR THE FORMATION, MOVEMENT, AND DISSIPATION OF FAIR WEATHER CUMULUS CLOUDS, AD-600 835 DIV. 2

METEOROLOGICAL SATELLITES
DATA TRANSMISSION SYSTEMS
METEOROLOGICAL PRODUCTS FROM DIGITIZED SATELLITE VIDICON CLOUD PICTURES, AD-600 078 DIV. 2

METEOROLOGY
CLOUDS
THEORETICAL AND OBSERVATIONAL STUDIES OF VORTEX CLOUD PATTERNS, AD-600 069 DIV. 2

METEOROLOGY
METEOROLOGICAL INSTRUMENTS
OPERATION AND PERFORMANCE OF THE CEDAR HILL, TEXAS METEOROLOGICAL TOWER FACILITY, AD-600 235 DIV. 2

METEOROLOGY
POLAR REGIONS
SEMINARS ON THE STRATOSPHERE, MESOSPHERE AND POLAR METEOROLOGY, AD-600 664 DIV. 2

METEOROLOGY
THEORY
COMPUTATION OF THE VERTICAL CIRCULATION IN A FRONTAL ZONE FROM THE QUASI-GEOSTROPHIC EQUATIONS, AD-600 368 DIV. 2

MEXICO GULF
OCEAN CURRENTS
SURFACE CIRCULATION IN NORTHEASTERN GULF OF MEXICO AND ITS RELATION TO LOCAL WINDS AND DENSITY VARIATIONS, AD-600 828 DIV. 2

MICROMINIATURIZATION (ELECTRONICS)
BIBLIOGRAPHIES
PRINTED CIRCUITS AND WELDED MODULES-ANNOTATED BIBLIOGRAPHY, AD-600 708 DIV. 8

MICROORGANISMS
PETROLEUM
MICROORGANISMS IN PETROLEUM PRODUCTS, AD-600 232 DIV. 10

MICROSCOPY
FLUORESCENCE
BIOLOGICAL APPLICATIONS OF ULTRAVIOLET FLUORESCENCE MICROSCOPY, AD-600 777 DIV. 14

MICROSEISMS
ALASKA
SHORT PERIOD MICROSEISMIC STUDY AT SKULL CLIFF, ALASKA, AD-600 254 DIV. 2

MICROWAVE AMPLIFIERS
ELECTRON GUNS
DESIGN CRITERIA FOR A LOW-NOISE, CROSS-FIELD ELECTRON GUN AMPLIFIER, AD-600 578 DIV. 8

MICROWAVE AMPLIFIERS
NOISE (RADIO)
FIVE-REACTANCE BROADBAND COMPENSATION FILTER DESIGNS, AD-600 949 DIV. 8

MICROWAVE AMPLIFIERS
PLASMA PHYSICS
BEAM-PLASMA AMPLIFICATION OF MILLIMETER WAVES, AD-600 302 DIV. 8

MICROWAVE AMPLIFIERS
S BAND
EXPERIMENTAL AND ANALYTICAL EVALUATION OF THE HIGH-EFFICIENCY CAPABILITIES OF THE CYCLOTRON-SYNCHRONOUS WAVE AMPLIFIERS, AD-600 559 DIV. 8

MICROWAVE AMPLIFIERS
X BAND
HIGH POWER X-BAND GENERATOR, AD-600 019 DIV. 8

MICROWAVE COMMUNICATION SYSTEMS
SUPERHIGH FREQUENCY
AIRBORNE COMMUNICATION SYSTEM: MARCOM RELAY, PHASE I, GATHERING AND ANALYSIS OF DATA ON AIR-TO-AIR AND GROUND-TO-AIR MICROWAVE PROPAGATION AND TRANSMISSION, AD-600 841 DIV. 5

MICROWAVE EQUIPMENT
DIODES (SEMICONDUCTOR)
HIGH BURNOUT-RESISTANT X-BAND TUNNEL DIODES FOR COUNTERMEASURES EQUIPMENT, AD-600 555 DIV. 8

MICROWAVE EQUIPMENT
ELECTRON TUBES
HIGH-POWER 100300 MC CRESTATRONS, AD-600 495 DIV. 8

MICROWAVE EQUIPMENT
ELECTRONIC SWITCHES
BROADBAND, SOLID STATE, HIGH POWER SWITCHES COVERING THE RANGE FROM 1 KMC TO 11 KMC, AD-600 290 DIV. 8

MICROWAVE EQUIPMENT
ENERGY CONVERSION
ELECTRON BEAM PARAMETRIC CONVERTER, AD-600 723 DIV. 8

MICROWAVE EQUIPMENT
PRODUCTION
DEVELOPMENT OF ADVANCED MICROWAVE COMPONENTS AND TECHNIQUES -PLANAR HEXAGONAL FERRITES AND DEVICES, AD-600 871 DIV. 8

MICROWAVE EQUIPMENT
S BAND
SOLID-STATE RF GENERATOR, AD-600 701 DIV. 8

MICROWAVE RELAY SYSTEMS
AIRBORNE
AIRBORNE COMMUNICATION SYSTEM: MARCOM RELAY, PHASE I, GATHERING AND ANALYSIS OF DATA ON AIR-TO-AIR AND GROUND-TO-AIR MICROWAVE PROPAGATION AND TRANSMISSION, AD-600 841 DIV. 5

MICROWAVES
PROPAGATION
ELECTRON INTERACTIONS IN CRYOGENIC HELIUM PLASMAS, AD-600 045 DIV. 25

MICROWAVES
SCATTERING
BACK SCATTERING AND ATTENUATION PROPERTIES OF CLOUD AND PRECIPITATION ELEMENTS IN THE MICROWAVE REGION, AD-600 693 DIV. 2

MILITARY COMMUNICATIONS
SPECIFICATIONS
DESIGN, DEVELOPMENT, HARDWARE FABRICATION AND TESTING OF THE COMMUNICATION SYSTEM AN/USC-3(V) PREPRODUCTION MODELS, AD-600 252 DIV. 5

MILITARY FACILITIES
ACOUSTIC PROPERTIES
ANALYSIS OF ACOUSTICAL PROBLEMS AT THE SATELLITE CONTROL FACILITY, AD-600 576 DIV. 12

MILITARY PERSONNEL
PERSONNEL MANAGEMENT
INTER-SERVICE CONFERENCE ON TECHNIQUES FOR DETERMINING THE MILITARY CAREER FORCE STRUCTURE, WASHINGTON, D. C, MAY 28-29, 1963, AD-600 052 DIV. 23

MILITARY PSYCHOLOGY
ARMY PERSONNEL
VALUES ASSOCIATED WITH MILITARY CAREER MOTIVATION, AD-600 037 DIV. 28

MILITARY STRATEGY
REVIEWS
APPRAISAL OF CHANGES IN THE SECOND EDITION OF MARSHAL V. D. SOKOLOVSKII'S 'MILITARY STRATEGY', AD-600 081 DIV. 18

MILITARY STRATEGY
USSR
APPRAISAL OF CHANGES IN THE SECOND EDITION OF MARSHAL V. D. SOKOLOVSKII'S 'MILITARY STRATEGY', AD-600 081 DIV. 18

MILITARY STRATEGY
WESTERN EUROPE
SOME IMPLICATIONS OF STRATEGIC CONCEPTS FOR WESTERN EUROPE NUCLEAR

OPTICAL EQUIPMENT
BIBLIOGRAPHIES
OPTICAL IMAGE CONVERTERS: AN ANNOTATED BIBLIOGRAPHY, 1961-1963,
AD-600 095 DIV. 8

OPTICAL EQUIPMENT
RANGE FINDING
SOVIET STATE-OF-THE-ART REVIEW ON OPTICAL DISTANCE-FINDER TECHNOLOGY,
AD-600 800 DIV. 2

OPTICAL EQUIPMENT COMPONENTS
AERIAL CAMERAS
OPTICAL DEVICE WHICH COMPENSATES FOR LINEAR SHIFT IN PANORAMIC STRIP AERIAL PHOTOGRAPHY WITH HORIZONTAL SCANNING,
AD-600 122 DIV. 24

OPTICAL FILTERS
PHOTOCHROMISM
PHOTOCHROMIC PROPERTIES OF THE TRIPLET STATE OF AROMATIC COMPOUNDS AND THEIR APPLICATION TO EYE-PROTECTIVE DEVICES,
AD-600 218 DIV. 4

OPTICAL INSTRUMENTS
GEODESICS
GEODIMETER SVV-1 AND THE RESULTS OF ITS PROVING TESTS,
AD-600 784 DIV. 2

OPTICAL INSTRUMENTS
VERTICAL INDICATORS
THEORETICAL ANALYSIS DEALING WITH THE PHYSICS OF USING THE OXYGEN HORIZON FOR VERTICAL SENSING,
AD-600 783 DIV. 1

OPTICAL TRACKING
SPACE SURVEILLANCE SYSTEMS
PASSIVE OPTICAL TECHNIQUES FOR SEPARATING ORBITING EARTH SATELLITES FROM THE CELESTIAL BACKGROUND,
AD-600 345 DIV. 6

OPTIMIZATION
FLIGHT CONTROL SYSTEMS
DESIGN OF LINEAR FLIGHT CONTROL SYSTEMS FOR AN X-15-TYPE AIRCRAFT USING OPTIMAL CONTROL THEORY,
AD-600 694 DIV. 1

ORDNANCE
TESTS
MATHEMATICAL AND STATISTICAL DEVELOPMENT OF FIXED AND SEQUENTIAL PLANS FOR QUALIFICATION TESTING MUNITION DISPERSION,
AD-600 673 DIV. 22

ORGANIC PHOSPHORUS COMPOUNDS
VISCOELASTICITY
VISCOELASTICITY OF ZINC PHENYLMETHYL PHOSPHINATE,
AD-600 931 DIV. 4

OVARIES
NERVE CELLS
EFFECT OF OVARIAN HORMONES ON THE ACTIVITY OF HYPOTHALAMIC NEURONES,
AD-600 381 DIV. 14

OXIDATION
REACTION KINETICS
OXIDATION REACTION KINETICS OF CESIUM AT LOW TEMPERATURES AND PRESSURES,
AD-600 928 DIV. 4

OXIDES
DISSOCIATION
MASS SPECTROMETRIC DETERMINATION OF THE DISSOCIATION ENERGY OF THE MOLECULES MGO, CAO, SRO AND SR2O,
AD-600 442 DIV. 4

OXIDES
NITROGEN COMPOUNDS
ANALYSIS OF THE ABSORPTION SPECTRUM OF THE NITRIC OXIDE MOLECULE,
AD-600 389 DIV. 25
NMR SPECTROSCOPY OF MIXTURES OF NITRIC ACID AND OXIDES OF NITROGEN,
AD-600 496 DIV. 25

OXIDIZERS
COMPATIBILITY
THE COMPATIBILITY OF WELDED STRUCTURAL MATERIALS WITH CHLORINE TRIFLUORIDE, PERCHLORYL FLUORIDE AND A MIXTURE OF THESE,
AD-600 000 DIV. 17

OXYGEN
PHOTOCATHODES
PHOTOELECTRIC EFFECT IN SILVER-OXYGEN-CESIUM PHOTOCATHODES,
AD-600 224 DIV. 8

OXYGEN
RADIATION MEASUREMENT SYSTEMS
THEORETICAL ANALYSIS DEALING WITH THE PHYSICS OF USING THE OXYGEN HORIZON FOR VERTICAL SENSING,
AD-600 783 DIV. 1

OXYGEN
REACTION KINETICS
CRITIQUE ON REACTION RATE CONSTANTS IN THE OXYGEN-NITROGEN SYSTEM OF HIGH-TEMPERATURE AIR,
AD-600 629 DIV.

OXYGEN CONSUMPTION
EXPOSURE
EFFECTS OF OXYGEN INHALATION ON RESPONSES TO COLD EXPOSURE,
AD-600 077 DIV. 14

OXYGEN CONSUMPTION
POISONING
ACUTE AND CHRONIC OXYGEN POISONING AT HIGH PRESSURE,
AD-600 773 DIV. 14

OXYGEN CONSUMPTION
RESPIRATION
NEUROLOGIC ASPECTS OF HIGH BAROMETRIC PRESSURE PHENOMENA AND THE EFFECT OF ATMOSPHERIC CONTAMINANTS UPON NERVOUS SYSTEM ACTIVITY,
AD-600 259 DIV. 14

OZONE
COMMERCIAL PLANES
OZONE MEASUREMENT SURVEY IN COMMERCIAL JET TRANSPORT AIRCRAFT,
AD-600 360 DIV. 1

OZONE
DETONATION WAVES
STEADY DETONATIONS IN GASEOUS OZONE,
AD-600 452 DIV. 25

OZONE
JET PLANES
OZONE MEASUREMENT SURVEY IN COMMERCIAL JET TRANSPORT AIRCRAFT,
AD-600 360 DIV. 1

OZONE
MEASUREMENT
OZONE MEASUREMENT SURVEY IN COMMERCIAL JET TRANSPORT AIRCRAFT,
AD-600 360 DIV. 1

PAPER
TENSILE PROPERTIES
EFFECTS OF RESTRAINT DURING DRYING ON THE STRENGTH, MODULUS OF ELASTICITY, AND STRAIN TO FAILURE OF HANDSHEETS,
AD-600 868 DIV. 14

PARABOLIC BODIES
STRUCTURAL SHELLS
MATHEMATICAL ANALYSIS OF DISTORTIONS AND STRESSES OF PARABOLOIDAL SURFACE STRUCTURES,
AD-600 125 DIV. 25

PARACHUTE DESCENTS
LOW ALTITUDE
MINIMUM AIRDROP ALTITUDES FOR MASS PARACHUTE DELIVERY OF PERSONNEL AND MATERIAL USING EXISTING STANDARD PARACHUTE EQUIPMENT,
AD-600 741 DIV. 1

PARACHUTES
AERODYNAMIC CHARACTERISTICS
AERODYNAMIC CHARACTERISTICS OF PARAFOIL GLIDER AND OTHER GLIDING PARACHUTES MODEL TESTS,
AD-600 861 DIV. 1

PARAMAGNETIC MATERIALS
SALTS
THE MAGNETIC FIELD DEPENDENCE OF PARAMAGNETIC RELAXATION IN A KRAMERS SALT AT LOW TEMPERATURES,
AD-600 076 DIV. 25

PARAMAGNETIC RESONANCE
RELAXATION TIME
PARAMAGNETIC RELAXATION OF FIXED CENTERS IN CRYSTALS,
AD-600 131 DIV. 25

PARAMAGNETIC RESONNANCE
RELAXATION TIME
THE MAGNETIC FIELD DEPENDENCE OF PARAMAGNETIC RELAXATION IN A KRAMERS SALT AT LOW TEMPERATURES,
AD-600 076 DIV. 25

PARAMETRIC AMPLIFIERS
DESIGN
FUNDAMENTAL PRINCIPLES OF PARAMETRIC AMPLIFICATION AND A QUANTITIVE TREATMENT OF VERY HIGH Q DIODES,
AD-600 405 DIV. 8

PARTIAL DIFFERENTIAL EQUATIONS
BOUNDARY VALUE PROBLEMS
ON A MIXED BOUNDARY VALUE PROBLEM FOR LINEAR THIRD ORDER HYPERBOLIC PARTIAL DIFFERENTIAL EQUATIONS,
AD-600 101 DIV. 15
DEFORMATION OF SOLITARY WAVES, PART III SHOALING,
AD-600 042 DIV. 9
SOLUTION TO THE INITIAL VALUE (CAUCHY) PROBLEM FOR LINEARIZED NAVIER-STOKES EQUATIONS,
AD-600 591 DIV. 9

PARTIAL DIFFERENTIAL EQUATIONS
FOURIER ANALYSIS
A FAST DIRECT SOLUTION OF POISSON'S EQUATION USING FOURIER ANALYSIS,
AD-600 164 DIV. 15

PARTIAL DIFFERENTIAL EQUATIONS
ORBITAL TRAJECTORIES
ERROR DERIVATIVES FOR ELLIPTIC ORBITS,
AD-600 458 DIV. 15

PARTICLE ACCELERATORS
DESIGN
STUDIES AND INSTRUMENTATION FOR ACCELERATING PARTICLES IN A PLASMA,
AD-600 761 DIV. 20

PASTEURELLA
DISEASES
PROBLEMS OF TULAREMIA IN THE SOVIET UNION,
AD-600 536 DIV. 16

PASTEURELLA TULARENSIS
DISEASES
TULAREMIA IN THE SOVIET UNION--AN ANNOTATED BIBLIOGRAPHY CONTAINING 293 REFERENCES,
AD-600 573 DIV. 16

PASTEURELLA TULARENSIS
VACCINES
BRIEF EVALUATION OF A SURVEY OF SOVIET LITERATURE ON TULAREMIA,
AD-600 569 DIV. 16

PATROL CRAFT
MODEL TESTS
MODEL TESTS OF A TUNNEL-BOTTOM 36-FOOT RIVER PATROL CRAFT,
AD-600 490 DIV. 21

PATTERN RECOGNITION
DIGITAL COMPUTERS
STUDY OF THE CHAIN-DIFFERENCE CORRELATION TECHNIQUE FOR CONTOUR LINE PATTERNS,
AD-600 276 DIV. 30

PATTERN RECOGNITION
MODELS (SIMULATIONS)
MODEL USED TO DEMONSTRATE THE FUNCTIONAL STRUCTURE OF A LEARNING MACHINE OR A PATTERN RECOGNITION SYSTEM,
AD-600 079 DIV. 30

PAVEMENTS
DESIGN
FLEXIBLE PAVEMENT DESIGN FOR AIRFIELDS,
AD-600 511 DIV. 13

PERCHLORATES
BURNING RATE
TEMPERATURE DISTRIBUTION DURING BURNING OF AMMONIUM PERCHLORATE,
AD-600 507 DIV. 4

PERFORMANCE TESTS
TIME
EFFECTS OF PAIRING TIME AND TEST TIME ON PERFORMANCE DURING AND AFTER PAIRED-ASSOCIATE TRAINING,
AD-600 647 DIV. 28

PERFORMANCE TESTS
TRANSFER OF TRAINING
REPLICATION OF PAIRED-ASSOCIATE LEARNING AS A FUNCTION OF S-R SIMILARITY,
AD-600 646 DIV. 28

PERFORMANCE (HUMAN)
ERRORS
METHOD OF ERROR SCORING CONTINUOUS TASKS IN PSYCHOLOGICAL AND PHYSIOLOGICAL EXPERIMENTS,
AD-600 653 DIV. 28

PERFORMANCE (HUMAN)
RELIABILITY
MEASUREMENT OF HUMAN RELIABILITY IN PERFORMANCE OF MAINTENANCE PERSONNEL FOR TITAN II ENGINES,
AD-600 176 DIV. 28

PERIODIC VARIATIONS
MAGNETIC PROPERTIES
VARIATION OF PERIODICITY OF MAGNETIC STRUCTURE WITH DILUTION AND TEMPERATURE FOR THE HEAVY RARE EARTH METALS,
AD-600 772 DIV. 25

PERIODICALS
NUCLEAR PHYSICS
NUCLEAR SCIENCE AND TECHNOLOGY RESEARCH,
AD-600 386 DIV. 20

PERSONALITY
STUDENTS
DIFFERENTIAL RESPONSE

NICKEL ALLOYS
CORROSION
THE COMPATIBILITY OF WELDED STRUCTURAL MATERIALS WITH CHLORINE TRIFLUORIDE, PERCHLORYL FLUORIDE AND A MIXTURE OF THESE,
AD-600 000 DIV. 17

NICKEL ALLOYS
CRYSTAL LATTICES
THERMAL CONDUCTIVITY OF COPPER-NICKEL ALLOYS AT 4.2 K,
AD-600 457 DIV. 17

NICKEL ALLOYS
SHEETS
MECHANICAL PROPERTIES OF NICKEL BASE ALLOY SHEET FOR HIGH TEMPERATURE APPLICATION,
AD-600 872 DIV. 17
METAL COATINGS TO PROTECT NIOBIUM ALLOYS FROM OXIDATION,
AD-600 391 DIV. 17

NIOBIUM ALLOYS
ROLLING (METALLURGY)
PROCESSING NIOBIUM-TUNGSTEN ZIRCONIUM ALLOY SHEET BARS TO SHEETS,
AD-600 403 DIV. 17

NIOBIUM ALLOYS
ZIRCONIUM ALLOYS
THE SOLUBILITY OF COLUMBIUM-1% ZIRCONIUM IN SODIUM BY ACTIVATION ANALYSIS,
AD-600 070 DIV. 17

NITRIC ACID
NUCLEAR SPECTROSCOPY
NMR SPECTROSCOPY OF MIXTURES OF NITRIC ACID AND OXIDES OF NITROGEN,
AD-600 496 DIV. 25

NITROGEN
HEATING
FURTHER DEVELOPMENT OF A GRAPHITE HEATER FOR HIGH PRESSURE NITROGEN OPERATION,
AD-600 010 DIV. 30

NITROGEN
REACTION KINETICS
CRITIQUE ON REACTION RATE CONSTANTS IN THE OXYGEN-NITROGEN SYSTEM OF HIGH-TEMPERATURE AIR,
AD-600 629 DIV. 4

NITROGEN
SHOCK WAVES
CHARTS OF NORMAL SHOCK WAVE PROPERTIES IN IMPERFECT NITROGEN
AD-600 844 DIV. 9

NITROGEN COMPOUNDS
OXIDES
ANALYSIS OF THE ABSORPTION SPECTRUM OF THE NITRIC OXIDE MOLECULE,
AD-600 389 DIV. 25

NOISE GENERATORS
MILLIMETER WAVES
NOISE SOURCE FOR MILLIMETER WAVELENGTH,
AD-600 246 DIV. 8

NOISE (RADIO)
STATISTICAL PROCESSES
THEORETICAL PROPERTIES OF NOISE PULSES WHICH ARE GENERATED BY A RANDOM PROCESS CROSSING A FIXED THRESHOLD LEVEL,
AD-600 796 DIV. 8

NONLINEAR DIFFERENTIAL EQUATIONS
NUMERICAL METHODS AND PROCEDURES
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM-IV: NONLINEAR EQUATIONS,
AD-600 161 DIV. 15

NON-DESTRUCTIVE TESTING
HALL EFFECT
NONDESTRUCTIVE EVALUATION OF METAL FATIGUE MAGNETIC INSPECTION OF STRESS CYCLED ROD-TYPE SPECIMENS,
AD-600 277 DIV. 17

NOSE CONES
COOLING
ETHYL ALCOHOL SOAKED EVAPORATIVE COOLING SHROUDS FOR SOUNDING ROCKET NOSE CONES,
AD-600 726 DIV. 22

NUCLEAR MAGNETIC RESONANCE
OSCILLATORS
DESIGN AND OPERATION OF A NUCLEAR GYROSCOPE,
AD-600 145 DIV. 20

NUCLEAR MAGNETIC RESONANCE
SCIENTIFIC RESEARCH
SUMMARY OF RESEARCH ON NUCLEAR MAGNETIC RESONANCE, ATOMIC SPECTROSCOPY, LOW-TEMPERATURE PHENOMENA, AND NUCLEAR STRUCTURE,
AD-600 874 DIV. 20

NUCLEAR MAGNETIC RESONANCE
THEORY
THEORY OF PULSED RF (SPIN ECHO) NUCLEAR MAGNETIC RESONANCE SYSTEMS,
AD-600 275 DIV. 25

NUCLEAR PARTICLES
MEASUREMENT
INSTRUMENTS AND METHODS OF ANALYSIS OF RADIATION,
AD-600 767 DIV. 20

NUCLEAR PHYSICS
GAMMA EMISSION
INDUCED GAMMA-RAY EMISSION FEASIBILITY STUDY OF ELECTROMAGNETIC WAVE GENERATORS,
AD-600 270 DIV. 20

NUCLEAR PHYSICS
SCIENTIFIC RESEARCH
NUCLEAR SCIENCE AND TECHNOLOGY RESEARCH,
AD-600 386 DIV. 20

NUCLEAR RADIATION SPECTROMETERS
DESIGN
DESIGN OF AN AUTOMATED FAST COINCIDENCE NUCLEAR RADIATION SPECTROMETER,
AD-600 143 DIV. 20
A HIGH ENERGY PROTON SPECTROMETER UTILIZING SEMICONDUCTOR DETECTORS FOR SPACE PHYSICS EXPERIMENTATION,
AD-600 154 DIV. 2

NUCLEAR RADIATION SPECTROMETERS
NEUTRON SPECTRUM
THE USE OF THE HELIUM 3 SPECTROMETER IN NEUTRON ATTENUATION MEASUREMENTS,
AD-600 057 DIV. 20

NUCLEAR RADIATION SPECTROMETERS
X-RAY SPECTROSCOPY
ULTRA-SOFT X-RAY SPECTROMETER,
AD-600 325 DIV. 25

NUCLEAR SHELL MODELS
ODD-ODD NUCLEI
SEMI-EMPIRICAL STUDY OF THE SHELL MODEL PROTON-NEUTRON INTERACTION,
AD-600 698 DIV. 20

NUCLEAR SPINS
NUCLEAR MAGNETIC RESONANCE
THEORY OF PULSED RF (SPIN ECHO) NUCLEAR MAGNETIC RESONANCE SYSTEMS,
AD-600 275 DIV. 25

NUCLEAR STRUCTURE
SCIENTIFIC RESEARCH
SUMMARY OF RESEARCH ON NUCLEAR MAGNETIC RESONANCE, ATOMIC SPECTROSCOPY, LOW-TEMPERATURE PHENOMENA, AND NUCLEAR STRUCTURE,
AD-600 874 DIV. 20

NUCLEAR WARFARE
COMPARISON OF RESPONSES TO QUESTIONNAIRE ON REACTION TO THE FALLOUT PROTECTION HANDBOOK,
AD-600 438 DIV. 28

NUCLEAR WEAPONS
EXPLOSION EFFECTS
NUCLEAR WEAPONS: CLASSIFICATION OF, MEANS FOR DELIVERY, DESCRIPTION OF THE DETONATIONS, EFFECTS OF AND PROTECTION FROM NUCLEAR WEAPONS,
AD-600 485 DIV. 22

NUCLEAR WEAPONS
MILITARY STRATEGY
SOME IMPLICATIONS OF STRATEGIC CONCEPTS FOR WESTERN EUROPE NUCLEAR WEAPONS,
AD-600 527 DIV. 18

NUCLEI
DECOMPOSITION
INSTANTANEOUS DECOMPOSITION OF AMERICIUM NUCLEI,
AD-600 489 DIV. 20

NUMERICAL ANALYSIS
INTEGRAL TRANSFORMS
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM STOCHASTIC TIME -OPTIMAL CONTROL,
AD-600 373 DIV. 15

NUMERICAL METHODS AND PROCEDURES
EFFICIENT USE OF NEWTON'S METHOD,
AD-600 736 DIV. 15

NUMERICAL METHODS AND PROCEDURES
BALLISTICS
ANALYTIC SOLUTIONS TO THE EQUATIONS OF MOTION OF MISSILES HAVING SIX DEGREES OF FREEDOM,
AD-600 544 DIV. 12

NUMERICAL METHODS AND PROCEDURES
EQUATIONS
NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM-IV: NONLINEAR EQUATIONS,
AD-600 161 DIV. 15

NUMERICAL SOLUTION OF FUNCTIONAL EQUATIONS BY MEANS OF LAPLACE TRANSFORM-VI MISMATCHED SYSTEMS OF LINEAR DIFFERENTIAL EQUATIONS,
AD-600 162 DIV. 15

NUMERICAL METHODS AND PROCEDURES
NONLINEAR DIFFERENTIAL EQUATIONS
ANALOG STUDY OF THE EFFECT OF THERMAL CONDUCTIVITY OF A MATERIAL ON THE HEAT IN A TURBINE BLADE,
AD-600 609 DIV. 27

N-HETEROCYCLIC COMPOUNDS
MOLECULAR STRUCTURE
STRUCTURE OF AN ANOMALOUS C8H10N2SO HETEROCYCLIC INTERMEDIATE,
AD-600 436 DIV. 4

OBESITY
DIET
EFFECTS OF VARIATIONS IN COMPOSITION OF DIET ON GROWTH RATE OF RATS,
AD-600 550 DIV. 16

OCEAN CURRENTS
MEXICO GULF
SURFACE CIRCULATION IN NORTHEASTERN GULF OF MEXICO AND ITS RELATION TO LOCAL WINDS AND DENSITY VARIATIONS,
AD-600 828 DIV. 2

OCEAN MODELS
WATER WAVES
SIMULATION OF IRREGULAR LONG-CRESTED (GAUSSIAN) SEAWAYS,
AD-600 238 DIV. 30

OCEANOGRAPHIC DATA
GRAVITY
WEST COAST LINEARITY RUN TO DETERMINE CALIBRATION FACTOR OF LACOSTE-ROMBERG GRAVITY METER S-9,
AD-600 388 DIV. 2

OCEANOGRAPHIC EQUIPMENT
DEPTH INDICATORS
DEPTH REGULATION OF LOWERED OCEANOGRAPHIC EQUIPMENT,
AD-600 187 DIV. 31

OCEANOGRAPHIC VESSELS
SHIP HULLS
WAVE-MAKING RESISTANCE OF CATAMARANS,
AD-600 840 DIV. 31

OCEANOLOGY
DATA
DEEP-OCEAN ENVIRONMENTAL KNOWLEDGE PERTAINING TO OCEANOGRAPHIC DATA,
AD-600 307 DIV. 13

OCEANOLOGY
MEXICO GULF
SURFACE CIRCULATION IN NORTHEASTERN GULF OF MEXICO AND ITS RELATION TO LOCAL WINDS AND DENSITY VARIATIONS,
AD-600 828 DIV. 2

OCEANOLOGY
SCIENTIFIC RESEARCH
DETERMINATION OF THE MARINE ENVIRONMENT BY BIOLOGICAL AND GEOPHYSICAL EXPLORATION,
AD-600 407 DIV. 2

ODD-ODD NUCLEI
QUANTUM MECHANICS
THE DYNAMIC COLLECTIVE THEORY OF ODD-A NUCLEI,
AD-600 710 DIV. 20

OFFICER PERSONNEL
APTITUDE TESTS
DEVELOPMENT AND STANDARDIZATION OF THE AIR FORCE OFFICER QUALIFYING TEST 64,
AD-600 782 DIV. 28

OFFICER PERSONNEL
PERFORMANCE (HUMAN)
PREDICTION OF OFFICER PERFORMANCE,
AD-600 038 DIV. 28

OPERATIONS RESEARCH
WARFARE
DIFFERENTIAL GAMES: A MATHEMATICAL THEORY WITH APPLICATIONS TO WARFARE AND OTHER TOPICS,
AD-600 022 DIV. 15

OPERATORS (MATHEMATICS)
ON BANACH ALGEBRA WITH SIGMA SYMBOL II,
AD-600 214 DIV. 15

OPTICAL EQUIPMENT
ANALOG SYSTEMS
OPTICAL PROCESSING SYSTEM USING THERMOPLASTIC AND OIL FILM TECHNIQUES FOR STOCHASTIC MATRIX STORAGE,
AD-600 379 DIV. 30

OPTICAL EQUIPMENT
AVIATION SAFETY
ROLE OF OPTICAL DEVICES IN MID-AIR COLLISION PREVENTION,
AD-600 326 DIV. 1

PLASTICIZERS
SPECTRA (INFRARED)
INFRARED SPECTRA OF POLYMERS, RESINS, WAXES, PLASTICIZERS, AND ORGANIC SOLVENTS,
AD-600 552 DIV. 14

PLASTICS
ABLATION
HEAT AND MASS TRANSFER DURING ABLATION OF POLYMERIC MATERIALS,
AD-600 631 DIV. 14

PLASTICS
CORROSION INHIBITION
PRODUCTION AND USE OF FAOLITE-ON CORROSION-RESISTANT PLASTIC,
AD-600 811 DIV. 14

PLASTICS
PRODUCTION
PRODUCTION AND USE OF FAOLITE-ON CORROSION-RESISTANT PLASTIC,
AD-600 811 DIV. 14

PLASTICS
SPECTRA (INFRARED)
INFRARED SPECTRA OF POLYMERS, RESINS, WAXES, PLASTICIZERS, AND ORGANIC SOLVENTS,
AD-600 552 DIV. 14

PLASTICS
TEST METHODS
AIRCRAFT INTERIOR MATERIALS TESTING FOR FLAMMABILITY AND SMOKE CHARACTERISTICS,
AD-600 387 DIV. 1

PLYWOOD
LIQUID IMMERSION TESTS
SEA WATER IMMERSION TESTS TO EVALUATE MARINE BORER AND FOULING DETERRENCY OF CERTAIN SPECIMENS OF PLYWOOD,
AD-600 414 DIV. 14

PLYWOOD
PRODUCTION
VENEER CUTTING AND DRYING PROPERTIES OF COTTONWOOD
AD-600 849 DIV. 14

PLYWOOD
PROTECTIVE TREATMENTS
THAMES CELPLY PANELS,
AD-600 397 DIV. 14

PNEUMATIC SERVOMECHANISMS
TIMING DEVICES
FLUID TIMER FOR ORDNANCE FOR USE IN FUZING, SAFING AND ARMING FUNCTIONS,
AD-600 661 DIV. 22

PNEUMATIC SYSTEMS
SPACECRAFT
SATELLITE ATTITUDE CONTROL SYSTEMS UTILIZING LOW THRUST, COLD GAS, MASS EXPULSION SYSTEMS,
AD-600 719 DIV. 12

POISONING
OXYGEN CONSUMPTION
ACUTE AND CHRONIC OXYGEN POISONING AT HIGH PRESSURE,
AD-600 773 DIV. 16

POLAR REGIONS
HEATING PLANTS
HEAT-LOSS STUDY OF ARMY BARRACKS IN POLAR REGIONS AND DESCRIPTION OF TWO HEATING SYSTEMS,
AD-600 619 DIV. 13

POLAR REGIONS
SNOW
SNOW DRIFTING IN POLAR REGIONS -LITERATURE REVIEW,
AD-600 700 DIV. 13

POLYAMIDE PLASTICS
FATIGUE (MECHANICS)
POLYAMIDE DESTRUCTION DURING CONTACT STRESSES,
AD-600 612 DIV. 14

POLYAMIDE PLASTICS
SYNTHESIS (CHEMISTRY)
SYNTHESIS OF HIGH MELTING POLYPYRAZOLES,
AD-600 813 DIV. 4

POLYATOMIC MOLECULES
MOLECULAR SPECTROSCOPY
BASIC CONCEPTS IN THE ELECTRONIC SPECTRA OF POLYATOMIC MOLECULES,
AD-600 163 DIV. 4

POLYESTER PLASTICS
RADIATION DAMAGE
POLY-(TETRAMETHYL-P-SILPHENYLENE) SILOXANES; STAR- AND COMB-TYPE POLYSTYRENES; FORCED OSCILLATION TORSION PENDULUM; NOVEL INORGANIC POLYMERS; IRRADIATED MYLAR,
AD-600 249 DIV. 14

POLYMERS
SPECTRA (INFRARED)
INFRARED SPECTRA OF POLYMERS, RESINS, WAXES, PLASTICIZERS, AND ORGANIC SOLVENTS,
AD-600 552 DIV. 14
SYNTHESIS AND EVALUATION OF POLYMERS WITH SPECIAL PROPERTIES,
AD-600 043 DIV. 4

POLYNOMIALS
NUMBER THEORY
THE SHIFT AND ADD PROPERTY OF MAXIMAL LENGTH BINARY SEQUENCES USING CYCLOTOMIC POLYNOMALS,
AD-600 521 DIV. 8

POLYNOMIALS
NUMERICAL ANALYSIS
A PROCEDURE FOR CALCULATING THE BESSEL FUNCTIONS J SUB NU (X)
AD-600 111 DIV. 15

POPULATION (MATHEMATICS)
SAMPLING
SAMPLE SIZE DETERMINATION NECESSARY TO ESTIMATE POPULATION CHARACTERISTICS (MATHEMATICS) WITHIN A SPECIFIED ACCURACY,
AD-600 308 DIV. 15

POROUS MATERIALS
HEAT TRANSFER
HEAT EXCHANGE IN A LIQUID PREHEATED POROUS PLATE IN A GAS STREAM,
AD-600 258 DIV. 9

POROUS METALS
MECHANICAL PROPERTIES
CELLULAR ALUMINUM FOR USE IN ENERGY DISSIPATION SYSTEMS,
AD-600 112 DIV. 17

POSITION FINDING
FLIGHT INSTRUMENTS
REGAL TEST PROGRAM SUPPORT: FLIGHT TESTING,
AD-600 826 DIV. 19

POSITION FINDING
VISION
PREDICTIONS OF SIGHTING RANGE BASED UPON MEASUREMENTS OF TARGET AND ENVIRONMENTAL PROPERTIES,
AD-600 855 DIV. 6

POSITIONING DEVICES (MACHINERY)
AIRCRAFT CONTROL CABLES
BREAKING-STRENGTH AND ENDURANCE TESTS OF ALUMINUM TURNBUCKLES FOR AIRCRAFT,
AD-600 169 DIV. 1

POWDER METALLURGY
MECHANICAL WORKING
PRODUCTION ENGINEERING MEASURE FOR BERYLLIUM OXIDE AND PARTS PRODUCED FROM IMPORTED ORES,
AD-600 126 DIV. 8

POWDERS
PREPARATION
KINETICS AND MECHANISMS OF COMMINUTION OF SODIUM CHLORIDE,
AD-600 674 DIV. 26

POWER SUPPLIES
ENERGY CONVERSION
POSSIBLE FUTURE ENERGY SOURCES,
AD-600 810 DIV. 30

POWER SUPPLIES
SPACE PROPULSION
POWER CONVERSION AND GENERATION TECHNIQUES FOR ELECTRIC PROPULSION ENGINES,
AD-600 833 DIV. 7

POWER SUPPLIES
SPACECRAFT
APPLIED RESEARCH PROGRAM FOR BINARY RANKINE CYCLE ENERGY CONVERSION,
AD-600 320 DIV. 7

PREFABRICATED BUILDINGS
POLAR REGIONS
TEMPORARY POLAR STRUCTURES MODIFIED T-S BARRACKS,
AD-600 526 DIV. 29

PRESERVATION
BIBLIOGRAPHIES
BIBLIOGRAPHY ON PRESERVATION OF INACTIVE EQUIPMENT AND LONG-TERM STORAGE OF MATERIALS,
AD-600 642 DIV. 18

PRESERVATION
HUMIDITY
DETERIORATION OF MATERIALS IN STORAGE AND RECOMMENDED STORAGE CONDITIONS,
AD-600 860 DIV. 14

PRESERVATION
MATERIALS
SURVEY OF LITERATURE ON DEHUMIDIFICATION AND DEHUMIDIFIED STORAGE IN WAREHOUSES,
AD-600 581 DIV. 24
EVALUATION OF U. S. NAVAL DEHUMIDIFIED WAREHOUSE PROGRAM,
AD-600 862 DIV. 24

PRESSES (MACHINERY)
TIME STUDIES
NOPF STANDARD TIME FORMULA FOR ENGRAVING MACHINE OPERATION TIME STUDIES,
AD-600 195 DIV. 24
NOPF STANDARD TIME FORMULA PF-1 REPORT FOR PUNCH PRESS,
AD-600 205 DIV. 24

PRESSURE GAGES
DESIGN
RECORDER OF PRESSURE PULSATIONS AND THEIR FREQUENCIES IN LIQUID AND GAS FLOWS,
AD-600 779 DIV. 30

PRESSURE VESSELS
COMPOSITE MATERIALS
EXPERIMENTAL INVESTIGATION OF CLOSURES AND PENETRATIONS FOR PRESSURE VESSELS OF COMPOSITE CONSTRUCTION,
AD-600 336 DIV. 31
FILAMENT-WOUND EMERGENCY AIR PRESSURE STORAGE VESSELS FOR HIGH-PERFORMANCE AIRCRAFT,
AD-600 213 DIV. 1

PRESSURE VESSELS
PENETRATION
EXPERIMENTAL INVESTIGATION OF CLOSURES AND PENETRATIONS FOR PRESSURE VESSELS OF COMPOSITE CONSTRUCTION,
AD-600 336 DIV. 31

PRINTED CIRCUITS
BIBLIOGRAPHIES
PRINTED CIRCUITS AND WELDED MODULES-ANNOTATED BIBLIOGRAPHY,
AD-600 708 DIV. 8

PRINTED CIRCUITS
PRODUCTION
PRODUCTION ENGINEERING MEASURE FOR MULTILAYER PRINTED WIRING BOARD,
AD-600 120 DIV. 8

PROBABILITY
PROBABILITY DENSITIES DEFINED BY THE ZERO-CROSSING POINTS OF THE ENVELOPE OF A SINE WAVE PLUS A GAUSSIAN PROCESS,
AD-600 393 DIV. 15

PROBABILITY
DECISION MAKING
MICROSTRUCTURE OF GUESS PROCESSES,
AD-600 474 DIV. 16

PROBABILITY
MEASURE THEORY
SOME PROBLEMS INVOLVING CIRCULAR AND SPHERICAL TARGETS,
AD-600 564 DIV. 15

PROBABILITY
THEOREMS
LIMIT DISTRIBUTIONS OF THE MINIMAX OF INDEPENDENT IDENTICALLY DISTRIBUTED RANDOM VARIABLES,
AD-600 005 DIV. 19

PROBES (ELECTROMAGNETIC)
PLASMA PHYSICS
USE OF GUARD RING SHIELDS ON NEGATIVELY BIASED LANGMUIR ION COLLECTION CURRENT PROBES,
AD-600 473 DIV. 25

PRODUCTION CONTROL
ENGINEERING
PRODUCTION ENGINEERING MEASURES FOR THE RELIABILITY IMPROVEMENT OF SILICON ALLOY TRANSISTORS,
AD-600 024 DIV. 8

PRODUCTION CONTROL
MAGNETRONS
PRODUCTION ENGINEERING MEASURE FOR VOLTAGE TUNABLE MAGNETRONS,
AD-600 094 DIV. 8

PROGRAMMING LANGUAGES
INSTRUCTION MANUALS
SABER (SYMBOLIC ASSEMBLY ROUTINE FOR THE CDC 1604-1604A COMPUTER),
AD-600 242 DIV. 30

PROGRAMMING LANGUAGES
PROGRAMMING (COMPUTERS)
PROBLEMS IN INFORMATION SCIENCE WITH EMPHASIS ON ADAPTATION TO USE THROUGH MAN-MACHINE INTERACTION,
AD-600 113 DIV. 30

PROGRAMMING (COMPUTERS)
AERODYNAMIC CHARACTERISTICS
INVESTIGATION OF DYNAMIC PROGRAMMING METHODS FOR FLIGHT CONTROL PROBLEMS,
AD-600 230 DIV. 9

PROGRAMMING (COMPUTERS)
CONTROL SEQUENCES
TELETYPE CODE PAPER TAPE PUNCH PROGRAM,
AD-600 243 DIV. 30
SCOPE VALIDATE MASTER TAPE COMPUTER PROGRAM,
AD-600 244 DIV. 30

TO APPRAISAL AND GOAL SETTING AS A FUNCTION OF SELF, GROUP INTERACTION, AND TASK ORIENTATION,
AD-600 296 DIV. 28

PERTURBATION THEORY
VON ZEIPEL PERTURBATION METHOD FOR FINDING AN APPROXIMATE SOLUTION TO DIFFERENTIAL EQUATIONS SUCH AS OCCUR IN NONLINEAR MECHANICS,
AD-600 413 DIV. 25

PERTURBATION THEORY
ATOMIC ENERGY LEVELS
UPPER AND LOWER BOUNDS FOR RAYLEIGH-SCHRODINGER PERTURBATION ENERGIES,
AD-600 114 DIV. 4

PERTURBATION THEORY
ELECTROMAGNETIC WAVES
EFFECT OF SMALL IRREGULARITIES ON ELECTROMAGNETIC SCATTERING FROM AN INTERFACE OF ARBITRARY SHAPE,
AD-600 543 DIV. 8

PETN
DETONATIONS
INITIATION OF EXPLOSIVES BY EXPLODING WIRES, III, EFFECT OF WIRE DIAMETER ON THE INITIATION OF PETN BY EXPLODING WIRES,
AD-600 058 DIV. 22

PHASED ARRAYS
ANTENNA CONFIGURATIONS
ERROR ANALYSIS OF PHASED-ARRAY DIRECTION FINDERS USING MULTIPLE BEAMS,
AD-600 429 DIV. 6

PHASE-LOCKED SYSTEMS
DESIGN
SYNCHRONOUS RECEIVER STUDIES FOR RE-ENTRY VEHICLES -PHASE LOCK LOOP,
AD-600 682 DIV. 8

PHOTOCATHODES
METAL FILMS
OPTICAL AND ELECTRICAL PROPERTIES OF SILVER FILMS IN GLASS USED IN PHOTOCATHODES,
AD-600 225 DIV. 8

PHOTOCATHODES
PHOTOELECTRIC EFFECTS
PHOTOELECTRIC EFFECT IN SILVER-OXYGEN-CESIUM PHOTOCATHODES,
AD-600 224 DIV. 8

PHOTOCHEMISTRY
VITAMIN B COMPLEX
SPECTRAL CHANGES DURING PHOTOBLEACHING OF RIBOFLAVIN PHOSPHATE,
AD-600 255 DIV. 4

PHOTOCHROMISM
AROMATIC COMPOUNDS
PHOTOCHROMIC PROPERTIES OF THE TRIPLET STATE OF AROMATIC COMPOUNDS AND THEIR APPLICATION TO EYE-PROTECTIVE DEVICES,
AD-600 218 DIV. 4

PHOTOCONDUCTIVITY
VIDICONS
FIELD ASSISTED METHOD OF INCREASING THE SENSITIVITY OF A VIDICON TARGET WHICH INCLUDES A THIN INSULATOR LAYER,
AD-600 434 DIV. 8

PHOTOELASTICITY
MODELS (SIMULATIONS)
RESEARCH ON THE PHOTOELECTRIC DETERMINATION OF STRESSES DUE TO THE DEAD WEIGHT IN PLANE STRUCTURES,
AD-600 687 DIV. 25

PHOTOELASTICITY
MODELS (SIMULATION)
EXPERIMENTAL SOLUTION OF SOME MIXED BOUNDARY VALUE PROBLEMS USING TWO MODELS,
AD-600 546 DIV. 15

PHOTOELECTRIC CELLS (SEMICONDUCTOR)
INTERFERENCE
MEASUREMENTS OF SILICON PHOTODIODE CHARACTERISTICS UNDER BACKGROUND RADIATION CONDITIONS,
AD-600 032 DIV. 8

PHOTOELECTRIC EFFECT
METALS
PHOTOELECTRIC EFFECT IN COLLOIDAL METAL PARTICLES,
AD-600 226 DIV. 25

PHOTOELECTRIC EFFECT
SURFACES
IMPROVED LONG WAVELENGTH RESPONSE OF PHOTOEMISSIVE SURFACES,
AD-600 168 DIV. 8

PHOTOELECTRIC MATERIALS
ELECTRICAL PROPERTIES
LAYER-LIKE FIELD INHOMOGENEITIES IN PHOTOCONDUCTORS IN THE PRE-BREAKDOWN RANGE,
AD-600 830 DIV. 25

PHOTOELECTRIC MATERIALS
EMISSIVITY
IMPROVED LONG WAVELENGTH RESPONSE OF PHOTOEMISSIVE SURFACES,
AD-600 168 DIV. 8

PHOTOENGRAVING
MOLECULAR ELECTRONICS
HIGH RESOLUTION RAPIDLY PROGRAMMABLE MASKING FOR FUNCTIONAL ELECTRONIC BLOCKS,
AD-600 714 DIV. 24

PHOTOGRAPHIC EMULSIONS
PROCESSING
EFFECT OF PROCESS TREATMENTS AND EMULSION BATCHES ON THE QUANTITY OF EMULSION SHIFT ON BALLISTIC CAMERA PLATES,
AD-600 824 DIV. 24

PHOTOGRAPHIC IMAGES
IMAGE INTENSIFIERS (ELECTRONICS)
CONTRAST MODULATION TECHNIQUES FOR PHOTOGRAPHIC IMAGE ENHANCEMENT,
AD-600 295 DIV. 24

PHOTOGRAPHIC PLATES
BALLISTIC CAMERAS
EFFECT OF PROCESS TREATMENTS AND EMULSION BATCHES ON THE QUANTITY OF EMULSION SHIFT ON BALLISTIC CAMERA PLATES,
AD-600 824 DIV. 24

PHOTOGRAPHIC TECHNIQUES
EFFECTIVENESS
EVALUATION AND TEST OF A SINGLE COLOR ELECTROSTATIC PRINTING MACHINE FOR THE REPRODUCTION OF TOPOGRAPHIC MAPS AND CHARTS,
AD-600 241 DIV. 2

PHOTONS
QUANTUM MECHANICS
GAUGE INVARIANT NON-LOCAL QUANTUM ELECTRODYNAMICS LEADING TO CONVERGENT RESULTS TO EVERY ORDER OF PERTURBATION THEORY,
AD-600 265 DIV. 25

PHYSIOLOGY
ELECTRIC CURRENTS
EVALUATION OF DIFFERENTIAL AMPLIFIER CIRCUITS USED IN ELECTROPHYSIOLOGICAL RESEARCH,
AD-600 124 DIV. 14
GENERAL ELECTROPHYSIOLOGY,
AD-600 133 DIV. 14

PHYSIOLOGY
HELIUM GROUP GASES
THE PHYSIOLOGICAL EFFECTS OF ARGON, HELIUM, AND THE RARE GASES,
AD-600 641 DIV. 14

PICTURES
CLOUDS
METEOROLOGICAL PRODUCTS FROM DIGITIZED SATELLITE VIDICON CLOUD PICTURES,
AD-600 078 DIV. 2

PIPES
PRODUCTION
NOPF STANDARD TIME FORMULA
PF-1 REPORT FOR PIPE FABRICATING,
AD-600 203 DIV. 26

PITUITARY HORMONES
RADIOPROTECTIVE AGENTS
PROTECTIVE AND THERAPEUTIC EFFECTS OF THE SOMATOTROPIC HORMONE IN ACUTE RADIATION SICKNESS,
AD-600 490 DIV. 14

PLANTS (BOTANY)
HEAT TRANSFER
THE ENERGY BUDGET OF VEGETATIVE COVER,
AD-600 453 DIV. 32

PLANTS (BOTANY)
SYMPOSIA
SYMPOSIA ON DRUGS FROM PLANTS OF THE FAR EAST, ELEUTHEROCOCCUS AND GINSENG,
AD-600 484 DIV. 14

PLASMA MEDIA
OPTIMIZATION
EFFECT OF COULOMB INTERACTION OF ELECTRONS WITH IONS ON THE OPTIMUM COMPOSITION OF A GASEOUS MIXTURE,
AD-600 607 DIV. 25

PLASMA PHYSICS
BETA PARTICLE REACTIONS
ELECTRON INTERACTIONS IN CRYOGENIC HELIUM PLASMAS,
AD-600 045 DIV. 25

PLASMA PHYSICS
BETATRONS
STUDIES AND INSTRUMENTATION FOR ACCELERATING PARTICLES IN A PLASMA,
AD-600 761 DIV. 20

PLASMA PHYSICS
ELECTRIC POWER PRODUCTION
LARGE-SIGNAL BEHAVIOR OF A PARAMETRIC MAGNETOGASDYNAMIC GENERATOR,
AD-600 004 DIV. 25

PLASMA PHYSICS
ELECTRICAL CONDUCTANCE
HIGH FREQUENCY CONDUCTIVITY TENSOR OF A HOT, DILUTE ELECTRON GAS NEAR EQUILIBRIUM,
AD-600 826 DIV. 25

PLASMA PHYSICS
ELECTRON BEAMS
ENHANCEMENT OF PLASMA DENSITY IN AN ARC DISCHARGE,
AD-600 542 DIV. 25

PLASMA PHYSICS
ELECTRON DENSITY
CONTINUUM RADIATION BEHIND A BLAST WAVE,
AD-600 217 DIV. 9

PLASMA PHYSICS
GAS FLOW
NUMERICAL METHODS FOR COMPUTING THE DENSITY OF A RAREFIED GAS ABOUT A MOVING OBJECT,
AD-600 401 DIV. 9

PLASMA PHYSICS
GAS IONIZATION
NANOSECOND PULSE BREAKDOWN IN AIR, HELIUM, AND NITROGEN,
AD-600 650 DIV. 25

PLASMA PHYSICS
KINETIC THEORY
A STATE-OF-THE-ART SURVEY OF SOME ASPECTS OF THE MECHANICS OF RAREFIED GASES AND PLASMAS,
AD-600 873 DIV. 25

PLASMA PHYSICS
MICROWAVE AMPLIFIERS
BEAM-PLASMA AMPLIFICATION OF MILLIMETER WAVES,
AD-600 302 DIV. 8

PLASMA PHYSICS
PENETRATION
PENETRATION OF PLASMA FROM A SOURCE WITH ELECTRON OSCILLATIONS TO AN EVACUATED REGION WITH A MAGNETIC FIELD,
AD-600 510 DIV. 8

PLASMA PHYSICS
PERTURBATION THEORY
ROTATIONAL EXCITATION OF MOLECULAR IONS BY ELECTRONS,
AD-600 430 DIV. 25

PLASMA PHYSICS
PROBES (ELECTROMAGNETIC)
USE OF GUARD RING SHIELDS ON NEGATIVELY BIASED LANGMUIR ION COLLECTION CURRENT PROBES,
AD-600 473 DIV. 25

PLASMA PHYSICS
PROTONS
UTILIZATION OF A HIGH PULSE IN PROTON SOURCES,
AD-600 886 DIV. 25

PLASMA PHYSICS
SCIENTIFIC RESEARCH
BASIC RESEARCH ON GAS FLOWS THROUGH ELECTRIC ARCS-HOT GAS CONTAINMENT LIMITS,
AD-600 798 DIV. 25

PLASMA PHYSICS
STABILITY
OPERATING POINTS AND STABILITY LIMITS OF A HIGH PRESSURE DIRECT CURRENT PLASMA ARC,
AD-600 845 DIV. 25

PLASMA PHYSICS
THERMIONIC CONVERTERS
PLASMA PROPERTIES IN A THERMIONIC CONVERTER,
AD-600 096 DIV. 8

PLASMA SHEATH
REENTRY VEHICLES
INFORMATION TRANSFER FUNCTIONS THROUGH THE PLASMA SHEATH OF A RE-ENTRY VEHICLE,
AD-600 821 DIV. 8

PLASTIC COATINGS
ENVIRONMENTAL TESTS
THE FIELD EVALUATION OF AN EXPERIMENTAL AIR DRY FUEL RESISTANT COATING,
AD-600 030 DIV. 14

PLASTIC PAINTS
ENVIRONMENTAL TESTS
EVALUATION OF 4 PAINTS AFTER EXPOSURE TO ENVIRONMENTS,
AD-600 357 DIV. 13

QUALITY CONTROL
INSTRUCTION MANUALS
PRODUCTION ENGINEERING MEASURE: RELIABILITY IMPROVEMENT: SILICON ALLOY TRANSISTOR, VOLUME III: QUALITY CONTROL MANUAL,
AD-600 026 DIV. 8

QUALITY CONTROL
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURES FOR THE RELIABILITY IMPROVEMENT OF SILICON ALLOY TRANSISTORS,
AD-600 024 DIV. 8
PRODUCTION ENGINEERING MEASURE: RELIABILITY IMPROVEMENT: SILICON ALLOY TRANSISTOR, VOLUME III: PROCESS SPECIFICATION MANUAL,
AD-600 025 DIV. 8

QUALITY CONTROL
TRANSISTORS
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY,
AD-600 283 DIV. 8

QUANTUM MECHANICS
ATOMIC ORBITALS
THE DIRECT DETERMINATION OF NATURAL ORBITALS AND NATURAL EXPANSION COEFFICIENTS OF MANY ELECTRON WAVE FUNCTIONS, I. NATURAL ORBITALS IN THE GEMINAL PRODUCT APPROXIMATION,
AD-600 146 DIV. 4

QUANTUM MECHANICS
DESIGN
DEVELOPMENT OF A SYSTEM OF CLASSIFICATION OF INERTIAL NAVIGATION SENSORS THAT WILL AID IN THE PREDICTION OF PERFORMANCE,
AD-600 571 DIV. 17

QUANTUM MECHANICS
ELECTROMAGNETIC FIELDS
GAUGE INVARIANT NON-LOCAL QUANTUM ELECTRODYNAMICS LEADING TO CONVERGENT RESULTS TO EVERY ORDER OF PERTURBATION THEORY,
AD-600 263 DIV. 25

QUANTUM MECHANICS
FERMIONS
INVESTIGATION OF THE COLLECTIVE VIBRATIONS OF A MANY-FERMION SYSTEM BY A GENERATOR COORDINATE METHOD,
AD-600 246 DIV. 25

QUANTUM MECHANICS
KINETIC THEORY
QUANTUM CORRECTIONS TO THE TRANSPORT CROSSSECTIONS,
AD-600 071 DIV. 4

QUANTUM MECHANICS
MAGNETIC FIELDS
QUANTIZER: DEVICE FOR TRAPPING AND DETECTING QUANTUM VALUES OF FLUX,
AD-600 177 DIV. 25

QUANTUM MECHANICS
MECHANICS
DEVELOPMENT OF A SYSTEM OF CLASSIFICATION OF INERTIAL NAVIGATION SENSORS THAT WILL AID IN THE PREDICTION OF PERFORMANCE,
AD-600 570 DIV. 17

QUANTUM MECHANICS
MOLECULAR SPECTROSCOPY
BASIC CONCEPTS IN THE ELECTRONIC SPECTRA OF POLYATOMIC MOLECULES,
AD-600 163 DIV. 4

QUANTUM MECHANICS
NUCLEI
THE CORIOLIS ANTI-PAIRING AND THE BLOCKING EFFECTS IN DEFORMED EVEN-EVEN NUCLEI,
AD-600 709 DIV. 20
THE DYNAMIC COLLECTIVE THEORY OF ODD-A NUCLEI,
AD-600 710 DIV. 20

QUANTUM MECHANICS
PERTURBATION THEORY
UPPER AND LOWER BOUNDS FOR RAYLEIGH-SCHRODINGER PERTURBATION ENERGIES,
AD-600 114 DIV. 4

QUANTUM MECHANICS
PLASMA PHYSICS
ROTATIONAL EXCITATION OF MOLECULAR IONS BY ELECTRONS,
AD-600 430 DIV. 25

QUANTUM MECHANICS
PROBABILITY
CALCULATIONS OF WAVE FUNCTIONS AND TRANSITION PROBABILITIES,
AD-600 374 DIV. 25

QUARTZ RESONATORS-CRYSTAL HOLDERS
CR-1(XH-4A)/UI MODERATE PRECISION GLASS ENCLOSED CRYSTAL UNITS,
AD-600 364 DIV. 8

QUARTZ RESONATORS
DESIGN
RESEARCH INTO NEW APPROACHES FOR VHF FILTER CRYSTALS,
AD-600 118 DIV. 8

QUARTZ RESONATORS
PRODUCTION
STEP I COMPLETION REPORT FOR HIGH PRECISION CRYSTAL UNITS: 5,000 KC, RUGGEDIZED,
AD-600 301 DIV. 8

RADAR
SCATTERING
RADAR SCATTERING FROM A CONDUCTING CONE-SPHERE,
AD-600 411 DIV. 8

RADAR BEACONS
HEIGHT FINDING
STUDY OF INTEGRITY, RELIABILITY AND ACCURACY OF AUTOMATIC HEIGHT REPORTING SYSTEM VIA ATC RADAR BEACON SYSTEM,
AD-600 137 DIV. 1

RADAR EQUIPMENT
HIGH FREQUENCY
HIGH-ACCURACY FREQUENCY STANDARDS IN AERIAL NAVIGATION -PRECISE CLOCKS,
AD-600 107 DIV. 17

RADAR EQUIPMENT
TRAVELING WAVE TUBES
GRIDDED 100 KW L-BAND TRAVELLING-WAVE TUBES FOR PULSED ARRAY RADAR SYSTEMS,
AD-600 312 DIV. 8

RADAR IMAGES
DESIGN
IMAGE DESIGN FOR TERRAIN-MAPPING RADAR SYSTEMS,
AD-600 084 DIV. 8

RADAR REFLECTIONS
LASERS
COHERENT OPTICAL RADAR PARAMETERS AND TARGET REFLECTIONS,
AD-600 272 DIV. 8

RADAR SCANNING
AIRBORNE
INVESTIGATION OF DIGITAL TECHNIQUES FOR RADAR LAND MASS SIMULATION,
AD-600 240 DIV. 6

RADAR SIGNALS
OPTIMIZATION
EFFECT OF SIGNAL SHAPE ON ITS DETECTION UNDER NORMAL CORRELATED NOISE,
AD-600 604 DIV. 8

RADAR TRACKING
PROGRAMMING (COMPUTERS)
PROGRAMMING TECHNIQUES AND SPECIFICATIONS FOR THE AN/FPS-85 SPACE TRACK RADAR SYSTEMS COMPUTER,
AD-600 660 DIV. 6

RADAR TRACKING
RADAR BEACONS
PERFORMANCE OF THE BINARY DELAY-LOCK TRACKING DISCRIMINATOR AS EVALUATED FROM LABORATORY-SIMULATED ENVIRONMENTS,
AD-600 599 DIV. 6

RADIATION DAMAGE
NEUTRONS
IRRADIATION EFFECTS ON STRUCTURAL MATERIALS,
AD-600 303 DIV. 20

RADIATION EFFECTS
AMPLIFIERS
TRANSIENT GAMMA AND NEUTRON RADIATION EFFECTS ON BASIC TRIODE AMPLIFIERS,
AD-600 770 DIV. 8
NON-THERMAL EFFECTS OF ALTERNATING ELECTRICAL FIELDS ON BIOLOGICAL STRUCTURES,
AD-600 263 DIV. 16

RADIATION EFFECTS
NEUTRONS
EFFECT OF NEUTRON EXPOSURE ON BONE GROWTH IN RATS,
AD-600 171 DIV. 16
A LITERATURE SURVEY,
AD-600 785 DIV. 16

RADIATION EFFECTS
REGENERATION
EFFECT OF IONIZING RADIATION ON REGENERATED LIVER OF WHITE MICE FOLLOWING BRIEF AND CHRONIC IRRADIATION,
AD-600 606 DIV. 16

RADIATION MEASUREMENT SYSTEMS
CALIBRATION
CD V-797 CALIBRATOR FOR THE CD V-711 REMOTE SENSOR RADIATION METER,
AD-600 297 DIV. 20
CALIBRATION OF A GM NUCLEAR DETECTOR,
AD-600 358 DIV. 20

RADIATION MEASUREMENT SYSTEMS
GAMMA COUNTERS
DEVELOPMENT AND EVALUATION OF A LOW COST 1-100 R/HR GAMMA RADIATION SURVEY METER,
AD-600 090 DIV. 20

RADIATION MEASUREMENT SYSTEMS
NEUTRON DETECTORS
BORON, LITHIUM, OR URANIUM COVERED SILICON THERMAL NEUTRON DETECTORS,
AD-600 583 DIV. 20

RADIATION MEASUREMENT SYSTEMS
NUCLEAR PARTICLES
INSTRUMENTS AND METHODS OF ANALYSIS OF RADIATION,
AD-600 767 DIV. 20

RADIATION MEASUREMENT SYSTEMS
SEMICONDUCTOR DEVICES
THE USE OF THE HELIUM 3 SPECTROMETER IN NEUTRON ATTENUATION MEASUREMENTS,
AD-600 087 DIV. 20

RADIATION MONITORS
DESIGN
CHARACTERISTICS OF AIR FILTER MEDIA USED FOR MONITORING AIRBORNE RADIOACTIVITY,
AD-600 292 DIV. 2

RADIO ASTRONOMY
THEORY OF NOISE-LIKE ELECTROMAGNETIC FIELDS OF ARBITRARY SPECTRAL WIDTH,
AD-600 434 DIV. 25

RADIO BEACONS
AIRCRAFT EQUIPMENT
ENVIRONMENTAL EVALUATION OF THE MODULATED CARRIER WAVE, TUMBLING-AIRFOIL, CRASH POSITION INDICATOR,
AD-600 053 DIV. 1

RADIO BEACONS
TESTS
SERVICE TEST OF THE AN/TRN-9(XC-2) RADIO BEACON,
AD-600 572 DIV. 17

RADIO COMMUNICATION SYSTEMS
COMMUNICATION SATELLITES (PASSIVE)
RADIO COMMUNICATION WITH THE AID OF MAN-MADE EARTH SATELLITES,
AD-600 309 DIV. 5

RADIO COMMUNICATION SYSTEMS
TERRAIN MODELS
DETERMINING THE SITE OF TRANSMITTERS FOR USW AND MICROWAVE RADIO COMMUNICATIONS WITH THE AID OF A TERRAIN MODEL,
AD-600 618 DIV. 8

RADIO COMMUNICATION SYSTEMS
TESTS
DESIGN, DEVELOPMENT, HARDWARE FABRICATION AND TESTING OF THE COMMUNICATION SYSTEM AN/USC-31(V) PREPRODUCTION MODELS,
AD-600 252 DIV. 5

RADIO NAVIGATION
AIRBORNE
HIGH-ACCURACY FREQUENCY STANDARDS IN AERIAL NAVIGATION -PRECISE CLOCKS,
AD-600 107 DIV. 17

RADIO SIGNALS
OPTIMIZATION
EFFECT OF SIGNAL SHAPE ON ITS DETECTION UNDER NORMAL CORRELATED NOISE,
AD-600 604 DIV. 8

RADIO TRANSMITTERS
MICROWAVE COMMUNICATION SYSTEMS
DETERMINING THE SITE OF TRANSMITTERS FOR USW AND MICROWAVE RADIO COMMUNICATIONS WITH THE AID OF A TERRAIN MODEL,
AD-600 618 DIV. 8

RADIOACTIVE DECAY
STRONTIUM
DECAY CHARACTERISTICS OF SR93 AS DETERMINED BY GAMMA-RAY SCINTILLATION SPECTROMETRY AND BETA-RAY PROPORTIONAL COUNTING,
AD-600 172 DIV. 20

RADIOACTIVE FALLOUT
AIRBORNE
SHAPING PATTERNS OF ATMOSPHERIC FALLOUT AT THE EARTH'S SURFACE BY LOCAL CIRCULATIONS,
AD-600 447 DIV. 20

RADIOACTIVE FALLOUT
MATHEMATICAL MODELS
STRATOSPHERIC CONCENTRATIONS OF NUCLEAR DEBRIS AND NATURAL RADIOACTIVITY -PROJECT STAR DUST,
AD-600 602 DIV. 20

RADIOACTIVITY
AIRBORNE
CHARACTERISTICS OF AIR FILTER MEDIA USED FOR MONITORING AIRBORNE RADIOACTIVITY,
AD-600 292 DIV. 2

BINARY CARD TO MAGNETIC TAPE COMPUTER PROGRAM VIA THE 088 CARD READER, AD-600 243 DIV. 30

COMPUTER PROGRAM FOR THE EXTRACTION OF GRAPHIC DATA FROM DIGITAL COMPUTERS, AD-600 616 DIV. 30

PROGRAMMING (COMPUTERS)
DECISION THEORY
CONVERSION OF LIMITED-ENTRY DECISION TABLES TO COMPUTER PROGRAMS, AD-600 412 DIV. 30

DESIGN-ANALYSIS PROGRAM FOR THE SHOCK DESIGN OF SHIPBOARD EQUIPMENT DEVELOPMENT OF COMPUTER METHODS, AD-600 335 DIV. 31

PROGRAMMING (COMPUTERS)
DIGITAL COMPUTERS
EVALUATING THE LOGICAL DESIGN OF THE PROBLEM ORIENTED SYMBOL PROCESSOR, AD-600 013 DIV. 30

EVALUATING THE LOGICAL DESIGN OF THE PROBLEM ORIENTED SYMBOL PROCESSOR, ADAM MICROPROGRAM DECKS AND 7094 INTERPRETIVE PROGRAM ASSEMBLIES, AD-600 014 DIV. 30

A COMPLETE FLOATING DECIMAL INTERPRETIVE SYSTEM FOR THE LGP-30 ROYAL MCBEE DIGITAL COMPUTER, AD-600 027 DIV. 30

PRELIMINARY DIAGNOSTIC PROGRAMS FOR RW 400 COMPUTER SYSTEM, AD-600 678 DIV. 30

PROGRAMMING (COMPUTERS)
MATRIX ALGEBRA
DIGITAL COMPUTER PROGRAM FOR THE ANALYSIS OF AEROSPACE STRUCTURES BY THE MATRIX DISPLACEMENT METHOD, AD-600 518 DIV. 1

PROGRAMMING (COMPUTERS)
NUMERICAL ANALYSIS
BLOCK RELAXATION BY COMPUTER, AD-600 740 DIV. 15

PROGRAMMING (COMPUTERS)
PROGRAMMERS
SABER (SYMBOLIC ASSEMBLY ROUTINE FOR THE CDC 1604-1604A COMPUTER), AD-600 242 DIV. 30

PROGRAMMING (COMPUTERS)
PROGRAMMING LANGUAGES
AERO-SPACE ENVIRONMENT SIMULATION SYSTEM (ASESS), VOLUME I, MASTER CONTROL PROGRAM AND PRESENTLY INCLUDED SUB-ROUTINES, AD-600 184 DIV. 9

PROGRAMMING (COMPUTERS)
RADAR TRACKING
PROGRAMMING TECHNIQUES AND SPECIFICATIONS FOR THE AN/FPS-85 SPACE TRACK RADAR SYSTEMS COMPUTER, AD-600 660 DIV. 6

PROGRAMMING (COMPUTERS)
SCIENTIFIC RESEARCH
MULTIPLE DISCRIMINATE FUNCTIONS AND AN EXAMPLE OF COMPUTER-AIDED CLASSIFICATION USING SUCH FUNCTIONS, AD-600 573 DIV. 2

PROGRAMMING (COMPUTERS)
TEACHING MACHINES
DELAY OF SELF-TESTING IN THREE TYPES OF PROGRAMED TEXT, AD-600 697 DIV. 23

PROJECTILES
AIR BURST
MALFUNCTION INVESTIGATION OF SIMULATOR, PROJECTILE AIR BURST! M74, AD-600 516 DIV. 22

PROPAGATION
ELECTROMAGNETIC WAVES
PARTIAL REFLECTIONS IN THE ATMOSPHERE AND LONG-DISTANCE PROPAGATION, AD-600 685 DIV. 8

PROPAGATION OF ELECTROMAGNETIC WAVES IN SINUSOIDALLY STRATIFIED DIELECTRIC MEDIA, AD-600 711 DIV. 8

PROPAGATION OF ELECTROMAGNETIC WAVES IN SINUSOIDALLY STRATIFIED DIELECTRIC MEDIA, AD-600 715 DIV. 6

PROPAGATION
MICROWAVES
PROPERTIES OF A SURFACE WAVE PROPAGATING ALONG A MAGNETIZED FERRITE ROD, AD-600 445 DIV. 8

PROPELLERS (MARINE)
CAVITATION
EXPERIMENTAL PERFORMANCE OF TAYLOR MODEL BASIN SUPERCAVITATING SHIP PROPELLERS, AD-600 361 DIV. 31

PROSTHETICS
CONTROL SYSTEMS
RESEARCH ON ELBOW PROSTHETICS, HUMAN TRACKING SENSORY MOTOR CONTROL, AND MYOELECTRIC CONTROL, AD-600 333 DIV. 16

PROSTHETICS
LAMINATED PLASTICS
SHRINKABLE SOCKETS PLASTIC PREFORMS TO CONFORM TO AN AMPUTEE'S STUMP, AD-600 804 DIV. 16

PROTECTIVE COVERINGS
ELECTRIC CONNECTORS
PRODUCTION ACCEPTANCE TESTING OF CABLE SPLICE CASES FOR MINUTEMAN INTERSITE COMMUNICATIONS SYSTEMS, AD-600 716 DIV. 12

PROTECTIVE SHELTERS
POLAR REGIONS
HEAT-LOSS STUDY OF ARMY BARRACKS IN POLAR REGIONS AND DESCRIPTION OF TWO HEATING SYSTEMS, AD-600 619 DIV. 13

PROTECTIVE TREATMENTS
LIQUID IMMERSION TESTS
SEA WATER IMMERSION TESTS OF SOUTHERN YELLOW PINE SAPWOOD PANELS IMPREGNATED WITH CELCURE, ERDALITH, CREOSOTE OR 60/40 CREOSOTE-COAL TAR, AD-600 398 DIV. 14

SEA WATER IMMERSION TESTS OF SOUTHERN YELLOW PINE SAPWOOD PANELS TREATED WITH COPPER SULFONATE UNCOATED AND COATED WITH NAVY FORMULA 105 OR 121 ANTIFOULING PAINT, AD-600 413 DIV. 14

SEA WATER IMMERSION TESTS OF MAHOGANY PLYWOOD AND RED OAK PANELS TREATED WITH COPPER FORMATE, TRIBUTYL TIN OXIDE AND CELCURE, UNPAINTED AND PAINTED WITH NAVY FORMULA 105 ANTIFOULING PAINT, AD-600 416 DIV. 14

PROTON REACTIONS
NUCLEAR SHELL MODELS
SEMI-EMPIRICAL STUDY OF THE SHELL MODEL PROTON-NEUTRON INTERACTION, AD-600 698 DIV. 20

PROTONS
NUCLEAR SPECTROSCOPY
A HIGH ENERGY PROTON SPECTROMETER UTILIZING SEMICONDUCTOR DETECTORS FOR SPACE PHYSICS EXPERIMENTATION, AD-600 154 DIV. 2

PROTONS
RADIATION EFFECTS
A LITERATURE SURVEY, AD-600 785 DIV. 16

PSYCHOACOUSTICS
HEARING
TRANSMISSION AND CODING OF INFORMATION IN AUDITORY NERVOUS SYSTEM, AD-600 222 DIV. 16

PSYCHOLOGY
BIBLIOGRAPHIES
BIBLIOGRAPHY OF REPORTS ISSUED BY THE BEHAVIORAL SCIENCES LABORATORY! ENGINEERING PSYCHOLOGY, TRAINING PSYCHOLOGY, ENVIRONMENTAL STRESS, SIMULATION TECHNIQUES, AND PHYSICAL ANTHROPOLOGY, AD-600 804 DIV. 28

PSYCHOMETRICS
FUNCTIONS
STUDIES OF MATHEMATICAL MODELS OF VISUAL PERFORMANCE CAPABILITY, AD-600 858 DIV. 28

PSYCHOMETRICS
LEARNING
REPLICATION OF PAIRED-ASSOCIATE LEARNING AS A FUNCTION OF S-R SIMILARITY, AD-600 646 DIV. 28

SERIAL POSITION AS A CUE IN LEARNING! THE EFFECT OF TEST-RATE, AD-600 649 DIV. 28

PSYCHOMETRICS
TIME
EFFECTS OF PAIRING TIME AND TEST TIME ON PERFORMANCE DURING AND AFTER PAIRED-ASSOCIATE TRAINING, AD-600 647 DIV. 28

PSYCHOMOTOR TESTS
VISUAL PERCEPTION
EVALUATION OF PERCEPTUAL FRAMES OF REFERENCE, AD-600 319 DIV. 28

PSYCHOPHYSIOLOGY
ANALYSIS OF MENTAL MECHANISMS OF THE CONDITIONED REFLEX AND THE THOUGHT PROCESSES IN THE HUMAN BRAIN, AD-600 585 DIV. 28

PUBLIC OPINION
SHELTERS
STUDY DESIGN AND DESCRIPTIONS OF NINE AMERICAN COMMUNITIES IN WHICH A SURVEY WAS MADE ON THE FALLOUT SHELTER ISSUE, AD-600 751 DIV. 32

PUBLIC OPINION SURVEY OF NINE AMERICAN COMMUNITIES CONCERNING THE FALLOUT-SHELTER ISSUE -METHODS, FINDINGS, AND IMPLICATIONS, AD-600 752 DIV. 32

PULSE COMPRESSION
GAS DISCHARGES
NANOSECOND PULSE BREAKDOWN IN AIR, HELIUM, AND NITROGEN, AD-600 650 DIV. 25

PULSE RATE
HEART
RELATION OF CHANGES IN THE HEART RATE TO MENTAL WORK AND EMOTIONS, AD-600 554 DIV. 16

PUMPS
SPACE STATIONS
INERTIA PUMPS FOR LIQUID TRANSFER TO AND FROM ORBITING SPACE STATIONS, AD-600 756 DIV. 27

REFRACTORY METALS
SHEETS
MECHANICAL AND PHYSICAL PROPERTIES OF TZM MOLYBDENUM ALLOY SHEET AND TUNGSTEN SHEET PRODUCED IN PHASE I OF THE REFRACTORY METAL SHEET ROLLING PROGRAM,
AD-600 281 DIV. 17

REFUELING IN FLIGHT
TOWED BODIES
FIT CHECK AND FLIGHT TEST OF UNIVERSAL AIR REFUELING DROGUE,
AD-600 677 DIV. 1

REGENERATION
RADIATION EFFECTS
EFFECT OF IONIZING RADIATION ON REGENERATED LIVER OF WHITE MICE FOLLOWING BRIEF AND CHRONIC IRRADIATION,
AD-600 606 DIV. 14

RELIABILITY (ELECTRONICS)
TRANSISTORS
TRANSISTOR CHARACTERIZATION AND DERATING FOR SECOND BREAKDOWN,
AD-600 142 DIV. 8
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY,
AD-600 445 DIV. 8
BIBLIOGRAPHY OF PROFESSIONAL PAPERS CLEARED FOR POSSIBLE PUBLICATION AND/OR PRESENTATION FROM AEROSPACE CORPORATION,
AD-600 728 DIV. 32

RESCUE BEACONS
ENVIRONMENTAL TESTS
ENVIRONMENTAL EVALUATION OF THE MODULATED CARRIER WAVE, TUMBLING-AIRFOIL, CRASH POSITION INDICATOR,
AD-600 053 DIV. 1

RESCUE KITS
MEDICAL SUPPLIES
PARARESCUE MEDICAL KIT,
AD-600 548 DIV. 14

RESISTANCE THERMOMETERS
SENSITIVITY
EVALUATION OF 0.000025 IN. DIA., 90% PLATINUM-10% RHODIUM WIRE AS A RESISTANCE THERMOMETER, MEASUREMENT OF TEMPERATURE FLUCTUATIONS IN THERMAL LAYER IN AN AIR FLOW ABOVE A FLAT PLATE,
AD-600 344 DIV. 30

RESISTANCE (ELECTRICAL)
STRAIN GAGES
ELECTRICAL RESISTANCE MEASURING DEVICES,
AD-600 776 DIV. 30

RESISTORS
MANUFACTURING METHODS
INDUSTRIAL PREPAREDNESS MEASURE: PRODUCTION OF 5% AND 10% RESISTANCE TOLERANCE FILM TYPE RESISTORS WITH HIGH STABILITY,
AD-600 783 DIV. 7

RESISTORS
PRODUCTION
PRODUCTION ENGINEERING MEASURE FOR RESISTOR CAPACITOR MICROELEMENTS FOR MICROMODULES,
AD-600 127 DIV. 8

RINGS
WOOD
PATTERN OF VARIATION OF FIBRIL ANGLE WITHIN ANNUAL RINGS OF PINUS ATTENURADIATA,
AD-600 857 DIV. 32

ROCKET CASES
HIGH-PRESSURE RESEARCH
ULTRA-HIGH STRENGTH SOLID PROPELLANT MOTOR CASES, HYDROBURST TESTS AND MECHANICAL PROPERTIES,
AD-600 743 DIV. 27

ROCKET FUZES
PROGRAMMING (COMPUTERS)
A MAGNETIC CORE ARMING PROGRAMMER FOR THE COPPERHEAD II FUZE SYSTEM,
AD-600 445 DIV. 22

ROCKET HEADS
FLIGHT TESTING
HASP, INSTRUMENTED, STATUS REPORT AND RECOMMENDATION FOR TERMINATION OF DEVELOPMENT OF THE HEAD, 1.425-INCH ROCKET MK 2 MOD 2,
AD-600 100 DIV. 12

ROCKET LAUNCHERS
PERFORMANCE (ENGINEERING)
DEVELOPMENT TESTING OF THE PHASE I ARMAMENT SUBSYSTEM HELICOPTER 2.75 INCH ROCKET LAUNCHER XM3,
AD-600 376 DIV. 22

ROCKET MOTORS
DESIGN
ANALYSIS OF POPPET VALVES FOR ROCKET MOTORS AND DESIGN DATA FOR SEATINGS,
AD-600 420 DIV. 27

ROCKET MOTORS (LIQUID PROPELLANT)
THRUST
THRUST VARIATION OF THE TITAN II TRANSLATION MOTOR PD50S0003,
AD-600 622 DIV. 10

ROCKET MOTORS (SOLID PROPELLANT)
MATERIALS
SOLID-PROPELLANT ROCKET MOTOR EXPOSED MATERIALS BEHAVIOR STUDY WITH TWO APPLICABLE DIGITAL COMPUTER PROGRAMS,
AD-600 593 DIV. 27

ROCKET MOTORS (SOLID PROPELLANT)
ROCKET CASES
ULTRA-HIGH STRENGTH SOLID PROPELLANT MOTOR CASES, HYDROBURST TESTS AND MECHANICAL PROPERTIES,
AD-600 743 DIV. 27

ROCKET MOTORS (SOLID PROPELLANT)
STORAGE
SHELF LIFE OF 16-NS-1000, M15 ROCKET MOTORS,
AD-600 324 DIV. 27

ROCKET NOSES
SOUNDING ROCKETS
ETHYL ALCOHOL SOAKED EVAPORATIVE COOLING SHROUDS FOR SOUNDING ROCKET NOSE CONES,
AD-600 726 DIV. 22

ROCKET PROPELLANTS
COMBUSTION PRODUCTS
THERMODYNAMIC PROPERTIES OF ROCKET EXHAUST PRODUCTS,
AD-600 280 DIV. 10

ROCKET PROPELLANTS
EXHAUST GASES
CALCULATION OF HEAT CAPACITIES AT HIGH TEMPERATURES AND APPLICATION TO GAS DYNAMICAL RELATIONSHIPS,
AD-600 298 DIV. 9

ROCKET PROPELLANTS
REVIEWS
SOVIET REVIEW OF PROPELLANT APPLICATION IN LIQUID-PROPELLANT ROCKETS,
AD-600 523 DIV. 10

ROCKETS
GUIDANCE
AUTOMATIC HOMING AND COMBINED ROCKET GUIDANCE SYSTEMS,
AD-600 488 DIV. 12

ROTOR BLADES (ROTARY WINGS)
MATERIALS
FIBER-GLASS-REINFORCED PLASTICS FOR ROTARY WING APPLICATIONS,
AD-600 514 DIV. 14

RUBY
ABSORPTION SPECTRUM
ULTRAVIOLET ABSORPTION SPECTRA OF RUBY-APPLICATION TO LASERS,
AD-600 293 DIV. 25

RUBY
ULTRAVIOLET SPECTROSCOPY
ULTRAVIOLET ABSORPTION SPECTRA OF RUBY-APPLICATION TO LASERS,
AD-600 293 DIV. 25

SAFETY
ELECTRONIC EQUIPMENT
UTILIZATION OF ELECTRONIC MEASURING EQUIPMENT IN INDUSTRIAL SAFETY,
AD-600 581 DIV. 14

SAFETY DEVICES
INDUSTRIAL PLANTS
UTILIZATION OF ELECTRONIC MEASURING EQUIPMENT IN INDUSTRIAL SAFETY,
AD-600 581 DIV. 14

SALICYLATES
LUMINESCENCE
ABSOLUTE QUANTUM EFFICIENCY OF SODIUM SALICYLATE BY EXTREME ULTRAVIOLET LIGHT,
AD-600 322 DIV. 25

SAMPLING
POPULATION (MATHEMATICS)
SAMPLE SIZE DETERMINATION NECESSARY TO ESTIMATE POPULATION CHARACTERISTICS (MATHEMATICS) WITHIN A SPECIFIED ACCURACY,
AD-600 308 DIV. 15

SAMPLING
STATISTICAL ANALYSIS
ESTIMATING LOCATION AND SCALE PARAMETERS FROM TRUNCATED SAMPLES,
AD-600 733 DIV. 15

SAND
MECHANICAL PROPERTIES
STATIC AND DYNAMIC SHEAR STRENGTH TEST OF DRY SAND,
AD-600 356 DIV. 7

SANDWICH PANELS
ENVIRONMENTAL TESTS
PERFORMANCE OF BUILDING CONSTRUCTED OF SANDWICH PANELS AT FOREST PRODUCTS LABORATORY, WISCONSIN,
AD-600 869 DIV. 13

SANDWICH PANELS
THERMODYNAMICS
INVESTIGATION OF THE TEMPERATURE FIELD IN AN ASSYMETRICALLY HEATED SANDWICH PLATE WITH A HONEYCOMB CORE,
AD-600 130 DIV. 25

SATELLITE ATTITUDE
CONTROL SYSTEMS
SATELLITE ATTITUDE CONTROL SYSTEMS UTILIZING LOW THRUST, COLD GAS, MASS EXPULSION SYSTEMS,
AD-600 719 DIV. 12

SATELLITES (ARTIFICIAL)
DAMPING
DAMPING A LIBRATING EARTH SATELLITE WITH A THIN BE-CU WIRE HELICAL SPRING,
AD-600 182 DIV. 25

SATELLITES (ARTIFICIAL)
DETECTION
PASSIVE OPTICAL TECHNIQUES FOR SEPARATING ORBITING EARTH SATELLITES FROM THE CELESTIAL BACKGROUND,
AD-600 545 DIV. 6

SATELLITES (ARTIFICIAL)
MOTION
EQUATIONS OF SATELLITE MOTION AND ITS APPLICATION TO INVESTIGATING KEPLERIAN-LIKE MOTION,
AD-600 778 DIV. 15

SATELLITES (ARTIFICIAL)
TRACKING
IONOSPHERIC CONTRIBUTIONS TO THE DOPPLER SHIFT AT VHF FROM EARTH SATELLITES,
AD-600 285 DIV. 6
ANALYSIS OF ACOUSTICAL PROBLEMS AT THE SATELLITE CONTROL FACILITY,
AD-600 576 DIV. 12

SAWS
WOOD
WOODWORKING MACHINES,
AD-600 859 DIV. 26

SCATTERING
CLOUDS
BACK SCATTERING AND ATTENUATION PROPERTIES OF CLOUD AND PRECIPITATION ELEMENTS IN THE MICROWAVE REGION,
AD-600 693 DIV. 2

SCIENTIFIC PERSONNEL
CHEMICAL ENGINEERING
SYMPOSIUM ON CHEMICAL PRODUCTION IN THE USSR,
AD-600 504 DIV. 23

SCIENTIFIC PERSONNEL
CHEMISTRY
PERSONNEL FOR APPLIED CHEMISTRY IN THE USSR -NEED FOR AND TRAINING,
AD-600 505 DIV. 23

SCIENTIFIC RESEARCH
NUCLEAR PHYSICS
NUCLEAR SCIENCE AND TECHNOLOGY RESEARCH,
AD-600 386 DIV. 20

SEALS (STOPPERS)
WELDING
ULTRASONIC WELDING WITH EMPHASIS ON PRODUCTION OF HERMETIC SEALS,
AD-600 597 DIV. 17

SEATS
VEHICLE BODY COMPONENTS
ANALYSIS OF POPPET VALVES FOR ROCKET MOTORS AND DESIGN DATA FOR SEATINGS,
AD-600 420 DIV. 27

SEDIMENTATION
WATER WAVES
COASTLINE OF THE COLUMBIA RIVER BETWEEN OREGON AND WASHINGTON,
AD-600 448 DIV. 2

SEISMOLOGY
INSTRUMENTATION
LOCAL SEISMIC MONITORING IN NEVADA IN RELATIONSHIP WITH PROJECT SHOAL,
AD-600 304 DIV. 2

SEISMOLOGY
PERIODICALS
OREGON STATE UNIVERSITY SEISMOLOGICAL BULLETIN NO. 1, JULY 1 TO SEPTEMBER 30, 1963,
AD-600 463 DIV. 2

RADIOFREQUENCY FILTERS
BROADBAND
FIVE-REACTANCE BROADBAND COMPENSATION FILTER DESIGNS, AD-600 449 DIV. 8

RADIOFREQUENCY GENERATORS
SEMICONDUCTOR DEVICES
SOLID-STATE RF GENERATOR, AD-600 701 DIV. 8

RADIOFREQUENCY INTERFERENCE
REDUCTION
COMMUNICATIONS INTERFERENCE REDUCTION STUDIES, AD-600 020 DIV. 8
ELIMINATION OF UNDESIRED RADIATION AND REDUCTION OF RADIO FREQUENCY INTERFERENCE OF DIRECTIONAL ANTENNAS BY MEANS OF RADAR ABSORBER MATERIALS, AD-600 652 DIV. 8

RADIOFREQUENCY INTERFERENCE
SENSITIVITY
RADIOFREQUENCY DESENSITIZED SILICON PNPN SWITCH DESIGNED FOR USE IN WEAPONS CIRCUITRY, AD-600 338 DIV. 8

RADIOGRAPHY
DIAGNOSTIC AGENTS
ISOTOPE METHOD OF RESEARCH IN A LIVING ORGANISM -A RADIOGRAPH MACHINE WHICH RECORDS GAMMA RADIATION IN A NONLINEAR INTEGRATED FORM CONTINUOUSLY OVER TIME, AD-600 611 DIV. 14

RADIOLOGICAL CONTAMINATION
AIR POLLUTION
MEASUREMENT OF RADIOLOGICAL CONTAMINATION OF THE ATMOSPHERE, AD-600 371 DIV. 20

RADIOLOGICAL WARFARE AGENTS
CLASSIFICATION
NUCLEAR WEAPONS; CLASSIFICATION OF, MEANS FOR DELIVERY, DESCRIPTION OF THE DETONATIONS, EFFECTS OF AND PROTECTION FROM NUCLEAR WEAPONS, AD-600 485 DIV. 22

RADIOPROTECTIVE AGENTS
BIOLOGICAL ASSAY
TESTING OF ANTIRADIATION AGENTS IN MONKEYS, AS AMENDED, AD-600 229 DIV. 16
GLYCIDIC ESTERS, ORGANIC DISULFIDES, AND RELATED SUBSTANCES, AS SOURCES OF ANTI-RADIATION DRUGS, AD-600 464 DIV. 4

RADIOPROTECTIVE AGENTS
CHEMICAL REACTIONS
GLYCIDIC ESTERS, ORGANIC DISULFIDES, AND RELATED SUBSTANCES, AS SOURCES OF ANTI-RADIATION DRUGS, AD-600 464 DIV. 4

RADIOPROTECTIVE AGENTS
PITUITARY HORMONES
PROTECTIVE AND THERAPEUTIC EFFECTS OF THE SOMATOTROPIC HORMONE IN ACUTE RADIATION SICKNESS, AD-600 490 DIV. 16

RADIOPROTECTIVE AGENTS
RADIATION TOLERANCE
SUMMARY OF THE EFFECTS OF WHOLE BODY IRRADIATION ON 112 CASES OF CANCER, AD-600 299 DIV. 16

RADIOPROTECTIVE AGENTS
TEST METHODS
TEST METHODS USED IN DETERMINING THE RADIOPROTECTIVE POTENCY OF 701 CODED COMPOUNDS, AD-600 228 DIV. 16

RADIOSONDES
FLIGHT TESTING
HASP, INSTRUMENTED, STATUS REPORT AND RECOMMENDATION FOR TERMINATION OF DEVELOPMENT OF THE HEAD, 1,625-INCH ROCKET MK 2 MOD 2, AD-600 100 DIV. 12

RADIOSONDES
RECORDING SYSTEMS
MODIFICATIONS TO RADIOSONDE RECORDER AN/TMQ-5C, AD-600 167 DIV. 8

RANGE FINDING
DISTANCE-MEASURING EQUIPMENT
SOVIET STATE-OF-THE-ART REVIEW ON OPTICAL DISTANCE-FINDER TECHNOLOGY, AD-600 800 DIV. 2

RANKINE CYCLE
ENERGY CONVERSION
APPLIED RESEARCH PROGRAM FOR BINARY RANKINE CYCLE ENERGY CONVERSION, AD-600 320 DIV. 7

RARE EARTH ELEMENTS
MAGNETIC PROPERTIES
VARIATION OF PERIODICITY OF MAGNETIC STRUCTURE WITH DILUTION AND TEMPERATURE FOR THE HEAVY RARE EARTH METALS, AD-600 772 DIV. 23

RATS
GROWTH
EFFECTS OF VARIATIONS IN COMPOSITION OF DIET ON GROWTH RATE OF RATS, AD-600 550 DIV. 16

REACTION KINETICS
AIR
CRITIQUE ON REACTION RATE CONSTANTS IN THE OXYGEN-NITROGEN SYSTEM OF HIGH-TEMPERATURE AIR, AD-600 629 DIV. 4

REACTION (PSYCHOLOGY)
ACHIEVEMENT TESTS
DIFFICULTY OF ITEMS ON AN ACHIEVEMENT TEST OF REPORT WRITING AND OTHER CORRELATES OF CRITICALNESS RESPONSE STYLE AT THE ITEM LEVEL, AD-600 702 DIV. 24

READING
STUDENTS
DELAY OF SELF-TESTING IN THREE TYPES OF PROGRAMED TEXT, AD-600 697 DIV. 23

REAL NUMBERS
SEQUENCES
LIMIT DISTRIBUTIONS OF THE MINIMAX OF INDEPENDENT IDENTICALLY DISTRIBUTED RANDOM VARIABLES, AD-600 005 DIV. 15

REASONING
CONDITIONED REFLEX
ANALYSIS OF MENTAL MECHANISMS OF THE CONDITIONED REFLEX AND THE THOUGHT PROCESSES IN THE HUMAN BRAIN, AD-600 585 DIV. 28

REASONING
EMOTIONS
RELATION OF CHANGES IN THE HEART RATE TO MENTAL WORK AND EMOTIONS, AD-600 554 DIV. 16

RECORDING SYSTEMS
ELECTROMAGNETIC WAVES
ELECTROMAGNETIC MEASUREMENTS DURING THE RAINSHEE SERIES, AD-600 665 DIV. 22

RECORDING SYSTEMS
RADIOSONDES
MODIFICATIONS TO RADIOSONDE RECORDER AN/TMQ-5C, AD-600 167 DIV. 8

RECTANGULAR BODIES
ANTENNAS
EXPERIMENTAL INVESTIGATIONS ON THE TRANSIENT RESPONSE CHARACTERISTICS OF RECTANGULAR LOOP ANTENNAS, AD-600 797 DIV. 8

RECTANGULAR BODIES
DEFORMATION
NUMERICAL SOLUTIONS OF BENDING OF RECTANGULAR PLATES WITH FINITE DEFLECTIONS, AD-600 390 DIV. 30

REDUNDANT COMPONENTS
REDUCTION
DEVICE FOR THE REDUCTION OF REDUNDANCY IN PULSE CODE MODULATED TELEMETRY DATA, AD-600 766 DIV. 8

REENTRY VEHICLES
ATMOSPHERE ENTRY
RE-ENTRY PHYSICS -INTERACTION OF VEHICLES IN EARLY RE-ENTRY ENVIRONMENT, AD-600 669 DIV. 12

REENTRY VEHICLES
CONTROL SYSTEMS
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM, STAR TRACKER, AD-600 637 DIV. 12

REENTRY VEHICLES
MATERIALS
RE-RADIATIVE STRUCTURES AND MATERIALS FOR RE-ENTRY VEHICLES, AD-600 626 DIV. 12

REENTRY VEHICLES
PLASMA SHEATH
INFORMATION TRANSFER FUNCTIONS THROUGH THE PLASMA SHEATH OF A RE-ENTRY VEHICLE, AD-600 821 DIV. 8

REENTRY VEHICLES
POWER SUPPLIES
SILVER OXIDE-ZINC ION EXCHANGE FUEL CELLS FOR MARK-3 RE-ENTRY VEHICLES, AD-600 634 DIV. 12

REENTRY VEHICLES
SYNCHROS
SYNCHRONOUS RECEIVER STUDIES FOR RE-ENTRY VEHICLES -PHASE LOCK LOOP, AD-600 682 DIV. 8

REENTRY VEHICLES
SYSTEMS ENGINEERING
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM, SOLAR PHOTON ENERGY SOURCES, AD-600 633 DIV. 12
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM, SOLAR THERMAL ENERGY SOURCES, AD-600 636 DIV. 12
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM SUBSYSTEM DESIGN ANALYSIS, AD-600 638 DIV. 12
WEAPON SYSTEM 107A-1, MARK-3 ADVANCED RE-ENTRY VEHICLE PROGRAM, INERTIAL WHEEL CONTROL, AD-600 683 DIV. 12

REFINING (METALLURGY)
STEEL
EVALUATION OF AIR MELTED AND VACUUM MELTED AISI 4340 STEEL, AD-600 727 DIV. 17

REFRACTORY COATINGS
CORROSION INHIBITION
HIGH-TEMPERATURE OXIDATION PROTECTIVE COATINGS FOR VANADIUM-BASE ALLOYS, AD-600 043 DIV. 17

REFRACTORY MATERIALS
AEROSPACE CRAFT
REFRACTORY CERAMICS OF INTEREST IN AEROSPACE STRUCTURAL APPLICATIONS -A MATERIALS SELECTION HANDBOOK, AD-600 588 DIV. 14

REFRACTORY MATERIALS
GRAPHITE
OXIDATION-RESISTANT GRAPHITE BASE COMPOSITES, AD-600 340 DIV. 14
HIGH-TEMPERATURE TENSILE PROPERTIES OF ZTA GRADE GRAPHITE, AD-600 466 DIV. 14

REFRACTORY MATERIALS
INDUSTRIAL PRODUCTION
PRODUCTION ENGINEERING MEASURE FOR BERYLLIUM OXIDE AND PARTS PRODUCED FROM IMPORTED ORES, AD-600 126 DIV. 8

REFRACTORY MATERIALS
RADIOGRAPHY
RADIOGRAPHY OF CARBON AND GRAPHITE, AD-600 339 DIV. 14

REFRACTORY MATERIALS
REENTRY VEHICLES
RE-RADIATIVE STRUCTURES AND MATERIALS FOR RE-ENTRY VEHICLES, AD-600 626 DIV. 12

REFRACTORY MATERIALS
THERMAL RADIATION
THERMAL RADIATION CHARACTERISTICS OF TRANSPARENT, SEMI-TRANSPARENT AND TRANSLUCENT MATERIALS UNDER NON-ISOTHERMAL CONDITIONS, AD-600 370 DIV. 14

REFRACTORY METAL ALLOYS
REFRACTORY METAL CONSTITUTION DIAGRAMS, AD-600 762 DIV. 17

REFRACTORY METAL ALLOYS
COATINGS
FEASIBILITY STUDIES FOR APPLICATION OF STABLE REFRACTORY COATING COMPOSITIONS TO PROTECT REFRACTORY METAL ALLOYS, AD-600 152 DIV. 17

REFRACTORY METAL ALLOYS
SOLUBILITY
THE SOLUBILITY OF COLUMBIUM-1% ZIRCONIUM IN SODIUM BY ACTIVATION ANALYSIS, AD-600 070 DIV. 17

REFRACTORY METALS
BIBLIOGRAPHIES
DEFENSE METALS INFORMATION CENTER SELECTED ACCESSIONS ON HIGH-STRENGTH ALLOYS, LIGHT METALS, NONMETALLICS, REFRACTORY METALS -MAY 1964, AD-600 803 DIV. 17

REFRACTORY METALS
MECHANICAL PROPERTIES
DEFORMATION CHARACTERISTICS OF BERYLLIUM AND OTHER REFRACTORY METALS AND ALLOYS, AD-600 363 DIV. 17

SILVER
METAL FILMS
OPTICAL AND ELECTRICAL PROPERTIES OF SILVER FILMS IN GLASS USED IN PHOTOCATHODES,
AD-600 225 DIV. 8

SILVER
PHOTOCATHODES
PHOTOELECTRIC EFFECT IN SILVER-OXYGEN-CESIUM PHOTOCATHODES,
AD-600 224 DIV. 8

SIMULATORS
MALFUNCTIONS
MALFUNCTION INVESTIGATION OF SIMULATOR, PROJECTILE AIR BURST: M74,
AD-600 516 DIV. 22

SIMULATORS
NUCLEAR EXPLOSIONS
EFFECTIVENESS OF A GRID IN A TRAVELING WAVE BLAST SIMULATOR,
AD-600 564 DIV. 30

SIMULATORS
RADAR SIGNALS
INVESTIGATION OF DIGITAL TECHNIQUES FOR RADAR LAND MASS SIMULATION,
AD-600 240 DIV. 6

SINGLE CRYSTALS
FERRITES
ON THE PREPARATION OF SINGLE CRYSTAL FERRITE MATERIALS BY THE FLOATING ZONE TECHNIQUE,
AD-600 062 DIV. 25

SINGLE CRYSTALS
GALLIUM COMPOUNDS
CAPACITANCE-VOLTAGE DEPENDANCE OF ZINC-DIFFUSED GAAS P-N JUNCTIONS, NON-LINEARITY OF THE IMPURITY DISTRIBUTION NEAR THE JUNCTION,
AD-600 696 DIV. 8

SINGLE CRYSTALS
GOLD
ACOUSTIC EMISSION IN GOLD SINGLE CRYSTALS UNDER APPLIED STRESS: ROLE OF THE SURFACE AND SURFACE FILMS,
AD-600 233 DIV. 25

SINGLE CRYSTALS
LITHIUM COMPOUNDS
INHIBITED DISSOLUTION RATES OF (100) SURFACES OF SINGLE CRYSTALS OF LITHIUM FLUORIDE-TECHNIQUE FOR DETERMINATION,
AD-600 328 DIV. 25

SINGLE CRYSTALS
TITANIUM COMPOUNDS
SINGLE CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE: MICROSTRUCTURAL FEATURES AND MICROHARDNESS,
AD-600 519 DIV. 25

SITE SELECTION
UNDERWATER
FACTORS INVOLVED IN RECONNAISSANCE AND POSITIONING FOR A DEEP-OCEAN CONSTRUCTION SITE,
AD-600 303 DIV. 13

SKELETAL MUSCLE RELAXANTS
ALKALOIDS
INVESTIGATION OF THE MECHANISM OF ACTION OF RYANODINE ON MAMMALIAN SKELETAL MUSCLE,
AD-600 282 DIV. 14

SLEEP
AUDITORY NERVE
TRANSMISSION AND CODING OF INFORMATION IN AUDITORY NERVOUS SYSTEM,
AD-600 222 DIV. 14

SLOT ANTENNAS
DESIGN
FERRITE-FILLED RECTANGULAR SLOT AND LOG CONICAL SPIRAL UHF-VHF ANTENNAS,
AD-600 557 DIV. 8

SLOT ANTENNAS
OPTIMIZATION
STUDY AND INVESTIGATION OF A UHF-VHF ANTENNA,
AD-600 116 DIV. 8

SMALL ARMS
TENSILE PROPERTIES
TENSILE AND IMPACT PROPERTIES OF INVESTMENT CAST STEELS,
AD-600 655 DIV. 22

SNOW
DRIFT
SNOW DRIFTING IN POLAR REGIONS -LITERATURE REVIEW,
AD-600 700 DIV. 13

SNOW
MECHANICAL PROPERTIES
DYNAMIC RESPONSE OF SNOW TO HIGH RATES OF LOADING,
AD-600 075 DIV. 2

SOILS
EVAPOTRANSPIRATION
THE ENERGY BUDGET OF VEGETATIVE COVER,
AD-600 453 DIV. 33

SOLAR CELLS
REENTRY VEHICLES
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM. SOLAR PHOTON ENERGY SOURCES,
AD-600 635 DIV. 12

SOLAR CORONA
SCIENTIFIC RESEARCH
RESEARCH ON SOLAR PHENOMENA- RADIATION, SPECTRA, CORONA, FLARES, SUNSPOTS, AND SOLAR-TERRESTRIAL CORRELATIONS,
AD-600 268 DIV. 2

SOLAR FLARES
STARS
SEARCH FOR PLANETARY OPTICAL EMISSION, AND STUDY OF FLARE ACTIVITY OF NEARBY STARS,
AD-600 154 DIV. 2

SOLAR RADIATION
PROTONS
A HIGH ENERGY PROTON SPECTROMETER UTILIZING SEMICONDUCTOR DETECTORS FOR SPACE PHYSICS EXPERIMENTATION,
AD-600 156 DIV. 2

SOLAR RADIATION
SOLAR DISTURBANCES
RESEARCH ON SOLAR PHENOMENA- RADIATION, SPECTRA, CORONA, FLARES, SUNSPOTS, AND SOLAR-TERRESTRIAL CORRELATIONS,
AD-600 268 DIV. 2

SOLAR SPECTRUM
SCIENTIFIC RESEARCH
RESEARCH ON SOLAR PHENOMENA- RADIATION, SPECTRA, CORONA, FLARES, SUNSPOTS, AND SOLAR-TERRESTRIAL CORRELATIONS,
AD-600 268 DIV. 2

SOLID STATE PHYSICS
OPTICAL PHENOMENA
SOLID-STATE TECHNIQUES FOR MODULATION AND DEMODULATION OF OPTICAL WAVES,
AD-600 419 DIV. 25

SOLIDS
FLUID DYNAMIC PROPERTIES
GAS-SOLID FLOW,
AD-600 248 DIV. 9

SONAR PROJECTORS
PERFORMANCE (ENGINEERING)
PERFORMANCE AND ANALYSIS OF SONAR TRANSMITTER USING PARALLEL INVERTER UNIT,
AD-600 377 DIV. 6

SONIC FATIGUE
INHIBITION
SONIC FATIGUE DAMPING MATERIAL,
AD-600 170 DIV. 1

SONIC FATIGUE
PANELS (STRUCTURAL)
TITAN 3 STRUCTURAL SKIN PANELS ACOUSTIC AND RANDOM VIBRATION FATIGUE REPORT,
AD-600 418 DIV. 12

SOUND SIGNALS
SPEECH RECOGNITION
LINGUISTIC AND ENGINEERING ASPECTS OF AUTOMATIC SPEECH RECOGNITION,
AD-600 494 DIV. 14

SOUND TRANSMISSION
GRAPHITE
EXPERIMENTAL METHOD OF DETERMINING THE VELOCITY OF SOUND IN GRAPHITE,
AD-600 876 DIV. 14

SOUND WAVES
PARTIAL DIFFERENTIAL EQUATIONS
SOLUTION TO THE INITIAL VALUE (CAUCHY) PROBLEM FOR LINEARIZED NAVIER-STOKES EQUATIONS,
AD-600 591 DIV. 9

SOUNDING ROCKETS
FLIGHT TESTING
MASP, INSTRUMENTED, STATUS REPORT AND RECOMMENDATION FOR TERMINATION OF DEVELOPMENT OF THE MEAD, 1.625-INCH ROCKET MK 2 MOD 2,
AD-600 100 DIV. 12

SOUNDING ROCKETS
METEOROLOGICAL INSTRUMENTS
TECHNIQUES AND EQUIPMENT FOR AN AIR LAUNCHED ROCKET SOUNDING SYSTEM COMPATIBLE WITH THE AN/AMQ-19 METEOROLOGICAL SYSTEM,
AD-600 400 DIV. 2

SOUNDING ROCKETS
TELEMETER SYSTEMS
SUPPORT OF THE UPPER AIR ROCKET RESEARCH PROGRAM
AD-600 269 DIV. 6

SPACE BIOLOGY
RADIATION EFFECTS
SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS, PT. A, BIOSCIENCES: COMPILATION OF ABSTRACTS,
AD-600 139 DIV. 14

SPACE COMMUNICATION SYSTEMS
COMMUNICATION SATELLITES (PASSIVE)
RADIO COMMUNICATION WITH THE AID OF MAN-MADE EARTH SATELLITES,
AD-600 309 DIV. 5

SPACE ENVIRONMENTAL CONDITIONS
KLEBSIELLA PNEUMONIAE
EFFECTS OF SPACE CABIN ENVIRONMENTS ON RESISTANCE OF MICE TO INFECTION WITH KLEBSIELLA PNEUMONIAE,
AD-600 408 DIV. 14

SPACE ENVIRONMENTAL CONDITIONS
TEST EQUIPMENT
TEMPERATURE EFFECTS ON THE CAPTURE COEFFICIENTS OF N, A, CO, N2O, O AND CO2,
AD-600 146 DIV. 30

SPACE FLIGHT
BIBLIOGRAPHIES
QUARTERLY BIBLIOGRAPHY OF REPORTS PREPARED UNDER CONTRACT NO. AF 04(695)-269,
AD-600 083 DIV. 12

SPACE MEDICINE
STUDY OF THE INFLUENCE OF VARIOUS FACTORS OF COSMIC FLIGHT ON THE HUMAN ORGANISM, BOTH AS REGARDS PROLONGED STAYING IN ORBIT AND AS TO COMPARING THE EFFECTS OF THESE FACTORS ON THE ORGANISMS OF MAN AND WOMAN,
AD-600 610 DIV. 14

SPACE PERCEPTION
THEORY
THEORY OF DEVELOPMENT AND PERCEPTION OF TIME -SPACE RELATIONS
AD-600 137 DIV. 14

SPACE STATIONS
PUMPS
INERTIA PUMPS FOR LIQUID TRANSFER TO AND FROM ORBITING SPACE STATIONS,
AD-600 736 DIV. 27

SPACE SURVEILLANCE SYSTEMS
OPTICAL TRACKING
PASSIVE OPTICAL TECHNIQUES FOR SEPARATING ORBITING EARTH SATELLITES FROM THE CELESTIAL BACKGROUND,
AD-600 545 DIV. 6

SPACECRAFT
POWER SUPPLIES
HYDROGEN-OXYGEN CAPILLARY FUEL CELLS FOR SPACE VEHICLE APPLICATIONS,
AD-600 658 DIV. 7

SPACECRAFT
TRACKING
COMPILATION OF ABSTRACTS REVIEWING SOVIET DEVELOPMENT IN THE TRACKING OF MISSILES AND SPACE VEHICLES,
AD-600 656 DIV. 12

SPARE PARTS
MATHEMATICAL PREDICTION
EXPONENTIAL SMOOTHING METHODS FOR PREDICTING THE DEMAND FOR SPARE PARTS,
AD-600 239 DIV. 15

SPECIAL FUNCTIONS (MATHEMATICAL)
TABLES
TABLES OF REGULAR AND LOGARITHMIC COULOMB WAVE FUNCTIONS AND TABLES OF GAMMA FUNCTIONS,
AD-600 284 DIV. 25

SPECTROPHOTOMETERS
ASTROPHYSICS
SEARCH FOR PLANETARY OPTICAL EMISSION, AND STUDY OF FLARE ACTIVITY OF NEARBY STARS,
AD-600 154 DIV. 2

SPECTRUM ANALYZERS
DATA STORAGE SYSTEMS
SPECTRUM ANALYZER USING MAGNETIC CORE DIGITAL STORAGE,
AD-600 216 DIV. 8

SPECTRUM ANALYZERS
PHOTOGRAPHIC RECORDING SYSTEMS
OSCILLOSCOPES EQUIPPED WITH POLAROID LAND CAMERAS FOR RECORDING RAPID CHANGES IN MASS SPECTRA,
AD-600 158 DIV. 25
SUMMARY OF RESEARCH ON SPEECH ANALYSIS AND SYNTHESIS,
AD-600 438 DIV. 14

SEISMOLOGY
SEISMIC WAVES
SYNTHETIC EARTHQUAKE SEISMOGRAMS FOR TELESEISMIC DISTANCES,
AD-600 103 DIV. 2

SEISMOLOGY
WAVE TRANSMISSION
SEISMOLOGY; THEORY OF REGULATABLE DIRECTIONAL RECEPTION (RNP),
AD-600 801 DIV. 2

SELF-PROPELLED GUNS
HOWITZERS
AUXILIARY PROPULSION KIT TO PROVIDE THE 105 MM HOWITZER XM-102 WITH ITS OWN MOBILE POWER,
AD-600 313 DIV. 22

SEMICONDUCTING FILMS
ELECTRICAL PROPERTIES
THIN FILMS OF INSB PREPARED BY VACUUM EVAPORATION, ELECTRICAL PROPERTIES, MAGNETIC PROPERTIES AND DIFFRACTION ANALYSIS OF ANNEALED AND UNANNEALED FILMS,
AD-600 725 DIV. 25

SEMICONDUCTING FILMS
PREPARATION
THIN FILMS OF INSB PREPARED BY VACUUM EVAPORATION, ELECTRICAL PROPERTIES, MAGNETIC PROPERTIES AND DIFFRACTION ANALYSIS OF ANNEALED AND UNANNEALED FILMS,
AD-600 725 DIV. 25
TECHNIQUES AND APPARATUS FOR EVAPORATING COMPOUND SEMICONDUCTORS, THIN FILMS OF INDIUM ANTIMONIDE AND INDIUM ARSENIDE,
AD-600 674 DIV. 25

SEMICONDUCTOR DEVICES
ELECTRONIC SWITCHES
BROADBAND, SOLID STATE, HIGH POWER SWITCHES COVERING THE RANGE FROM 1 KMC TO 11 KMC,
AD-600 290 DIV. 8

SEMICONDUCTOR DEVICES
MACHINES
CONTINUOUS PROCESSES FOR FUNCTIONAL ELECTRONIC BLOCKS,
AD-600 847 DIV. 8

SEMICONDUCTOR DEVICES
PERFORMANCE
MEASUREMENTS OF SILICON PHOTODIODE CHARACTERISTICS UNDER BACKGROUND RADIATION CONDITIONS,
AD-600 032 DIV. 8

SEMICONDUCTOR DEVICES
PRODUCTION
HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) AND HIGH SPEED SEMICONDUCTOR SWITCH (GATE),
AD-600 060 DIV. 26

SEMICONDUCTOR DEVICES
RADIOFREQUENCY GENERATORS
SOLID-STATE RF GENERATOR,
AD-600 701 DIV. 8

SEMICONDUCTORS
CATALYSIS
SEMICONDUCTOR CATALYSIS; SIMULTANEOUS MEASUREMENT OF KINETICS AND SURFACE ELECTRICAL PROPERTIES,
AD-600 080 DIV. 4

SEMICONDUCTORS
ELECTRICAL PROPERTIES
EFFECTS OF PLASTIC DEFORMATION, ANNEALING, AND FATIGUE ON THE ELECTRICAL PROPERTIES OF THE SEMICONDUCTOR INDIUM ANTIMONIDE,
AD-600 256 DIV. 25

SEMICONDUCTORS
FILMS
ULTRA HIGH VACUUM SPUTTERING TECHNIQUES FOR THE FORMATION OF THIN SEMICONDUCTOR FILMS,
AD-600 799 DIV. 25

SEMICONDUCTORS
GRAIN BOUNDARIES
ELECTRICAL CHARACTERISTICS OF GRAIN BOUNDARIES IN COMPOUND SEMICONDUCTORS,
AD-600 321 DIV. 25

SEQUENCES
MATHEMATICAL LOGIC
CANONICAL REPRESENTATIONS OF CHAIN EVENTS,
AD-600 734 DIV. 15

SEQUENCES
PSEUDO-RANDOM SYSTEMS
THE SHIFT AND ADD PROPERTY OF MAXIMAL LENGTH BINARY SEQUENCES USING CYCLOTOMIC POLYNOMALS,
AD-600 521 DIV. 8

SERIES
STATISTICAL ANALYSIS
BISPECTRAL ANALYSIS OF STATIONARY TIME SERIES,
AD-600 468 DIV. 15

SERVOMECHANISMS
OPERATION
FUNCTIONAL DESCRIPTION OF THE DIGITAL-ANALOG SERVO SYSTEM,
AD-600 294 DIV. 22

SHAFTS
MECHANICAL PROPERTIES
APPROXIMATION METHOD FOR THE CALCULATION OF STRESS INCREASES AT THE TRANSITION POINTS OF STEPPED OR GROOVED SHAFTS,
AD-600 689 DIV. 27

SHAPED CHARGES
SCALE
SCALING TECHNIQUES FOR SHAPED CHARGES,
AD-600 273 DIV. 22

SHEAR STRESSES
LAMINATED PLASTICS
METHODS FOR EVALUATING SHEAR STRENGTH OF PLASTIC LAMINATES REINFORCED WITH UNWOVEN GLASS FIBERS,
AD-600 860 DIV. 14

SHEETS
NICKEL ALLOYS
MECHANICAL PROPERTIES OF NICKEL BASE ALLOY SHEET FOR HIGH TEMPERATURE APPLICATION,
AD-600 872 DIV. 17

SHEETS
PAPER
EFFECTS OF RESTRAINT DURING DRYING ON THE STRENGTH, MODULUS OF ELASTICITY, AND STRAIN TO FAILURE OF HANDSHEETS,
AD-600 868 DIV. 14

SHEETS
PLASTICITY
FINITE INDENTATION OF AN ELASTIC MEMBRANE BY A SPHERICAL INDENTER,
AD-600 743 DIV. 25

SHEETS
TUNGSTEN ALLOYS
DEVELOPMENT OF A DUCTILE TUNGSTEN BASE SHEET ALLOY,
AD-600 764 DIV. 17

SHELTERS
ARCTIC REGIONS
RIGID FOAM PLASTICS SHELTERS, GREENLAND FIELD TESTS,
AD-600 654 DIV. 14

SHELTERS
COMMUNICATION SYSTEMS
STUDY AND DEVELOPMENT OF SPECIFICATIONS FOR PROTOTYPE TRANSMITTERS AND RECEIVERS FOR FALLOUT SHELTER COMMUNICATIONS SYSTEMS,
AD-600 065 DIV. 18

SHELTERS
FIRES
FIRE HAZARD TO FALLOUT SHELTER OCCUPANTS, A CLASSIFICATION GUIDE,
AD-600 261 DIV. 13

SHELTERS
PREFABRICATED BUILDINGS
TEMPORARY POLAR STRUCTURES MODIFIED T-5 BARRACKS,
AD-600 528 DIV. 29

SHELTERS
PUBLIC OPINION
STUDY DESIGN AND DESCRIPTIONS OF NINE AMERICAN COMMUNITIES IN WHICH A SURVEY WAS MADE ON THE FALLOUT SHELTER ISSUE,
AD-600 751 DIV. 32
PUBLIC OPINION SURVEY OF NINE AMERICAN COMMUNITIES CONCERNING THE FALLOUT-SHELTER ISSUE -METHODS, FINDINGS, AND IMPLICATIONS,
AD-600 752 DIV. 32

SHELTERS
SURVIVAL
PSYCHOLOGICAL EFFECTS OF SHELTER OCCUPANCY,
AD-600 064 DIV. 28
MOISTURE IN SURVIVAL SHELTERS -METHODS FOR ELIMINATION,
AD-600 423 DIV. 4

SHELTERS
SURVIVAL HUMIDITY
MOISTURE IN SURVIVAL SHELTERS -CONTROL OF,
AD-600 437 DIV. 4

SHIP HULLS
FLUID DYNAMIC PROPERTIES
WAVE-MAKING RESISTANCE OF CATAMARANS,
AD-600 840 DIV. 31

SHOCK TUBES
DESIGN
DESIGN FEATURES OF THE GENERAL ELECTRIC RESEARCH LABORATORY HYPERSONIC SHOCK TUNNEL,
AD-600 345 DIV. 20

SHOCK TUBES
TEST METHODS
SHOCK TUNNEL EXPERIMENTAL TECHNIQUES FOR FORCE AND MOMENT AND SURFACE FLOW DIRECTION MEASUREMENTS,
AD-600 667 DIV. 9

SHOCK WAVES
EXPLOSION EFFECTS
CONTINUUM RADIATION BEHIND A BLAST WAVE,
AD-600 217 DIV. 9

SHOCK WAVES
FLUID DYNAMIC PROPERTIES
SUPERSONIC SEPARATED AND REATTACHING LAMINAR FLOWS; I, GENERAL THEORY AND APPLICATION TO ADIABATIC BOUNDARY LAYER-SHOCK WAVE INTERACTIONS,
AD-600 097 DIV. 9
CHARTS OF NORMAL SHOCK WAVE PROPERTIES IN IMPERFECT NITROGEN
AD-600 844 DIV. 9

SHOCK WAVES
STEEL
STRENGTHENING IRON-BASE ALLOYS BY SHOCK WAVES,
AD-600 579 DIV. 17

SHOCK (PATHOLOGY)
BLOOD PLASMA
THERAPEUTIC PROPERTIES OF BLOOD PLASMA IN THE THERAPY OF TOURNIQUET SHOCK,
AD-600 260 DIV. 14

SHORT TAKE-OFF PLANES
AERIAL PICKUP SYSTEMS
AIR-TO-GROUND PICKUP SYSTEM FOR CARIBOU AIRCRAFT,
AD-600 500 DIV. 1

SHROUD RINGS
PERFORMANCE (ENGINEERING)
NUMERICAL EVALUATION PROCEDURES FOR SHROUD PERFORMANCE OF FINITE-BLADED DUCTED PROPELLERS,
AD-600 577 DIV. 1

SHROUDED PROPELLERS
PERFORMANCE (ENGINEERING)
NUMERICAL EVALUATION PROCEDURES FOR SHROUD PERFORMANCE OF FINITE-BLADED DUCTED PROPELLERS,
AD-600 577 DIV. 1

SIGNALS
WAVE TRANSMISSION
COMMUNICATION THEORY GROUP,
AD-600 048 DIV. 8

SILANES
HYDROLYSIS
HYDROLYSIS OF ORGANOCHLOROSILANES IN A COUNTINUOUS COUNTERFLOW SPRAY,
AD-600 789 DIV. 4

SILICATES
PHASE STUDIES
STUDIES RELATED TO THE CRYSTALLIZATION OF GLASSES; CONTROLLED PHASE SEPARATION DUE TO METASTABLE LIQUID IMMISCIBILITY IN SIMPLE SILICATE SYSTEMS,
AD-600 744 DIV. 14

SILICON
PHOTOELECTRIC EFFECT
MEASUREMENTS OF SILICON PHOTODIODE CHARACTERISTICS UNDER BACKGROUND RADIATION CONDITIONS,
AD-600 032 DIV. 8

SILICON
TRANSISTORS
DESIGN, HIGH VOLTAGE CAPABILITY, AND ENCAPSULATION OF A 500 WATT SILICON POWER TRANSISTOR,
AD-600 680 DIV. 8
DELETERIOUS SURFACE PHENOMENA EFFECTS ON SILICON TRANSISTORS,
AD-600 873 DIV. 8

SILICONE PLASTICS
PRODUCTION
HYDROLYSIS OF ORGANOCHLOROSILANES IN A COUNTINUOUS COUNTERFLOW SPRAY,
AD-600 789 DIV. 4

SILICONE PLASTICS
SYNTHESIS (CHEMISTRY)
SYNTHESIS OF REGULATED STRUCTURE POLYPHENYLETHER-SILOXANE BLOCK COPOLYMERS,
AD-600 121 DIV. 14

SILOXANES
CRYSTALLIZATION
POLY-(TETRAMETHYL-P-SILPHENYLENE) SILOXANES; STAR- AND COMB-TYPE POLYSTYRENES; FORCED OSCILLATION TORSION PENDULUM; NOVEL INORGANIC POLYMERS; IRRADIATED MYLAR,
AD-600 249 DIV. 14

BY GAMMA-RAY SCINTILLATION SPECTROMETRY AND BETA-RAY PROPORTIONAL COUNTING,
AD-600 172 DIV. 20

STRONTIUM
RADIOACTIVE DECAY
DECAY CHARACTERISTICS OF SR93 AS DETERMINED BY GAMMA-RAY SCINTILLATION SPECTROMETRY AND BETA-RAY PROPORTIONAL COUNTING,
AD-600 172 DIV. 20

STRONTIUM COMPOUNDS
OXIDES
MASS SPECTROMETRIC DETERMINATION OF THE DISSOCIATION ENERGY OF THE MOLECULES MGO, CAO, SRO AND SR2O,
AD-600 442 DIV. 4

STRUCTURAL PARTS
ORES (METAL SOURCES)
PRODUCTION ENGINEERING MEASURE FOR BERYLLIUM OXIDE AND PARTS PRODUCED FROM IMPORTED ORES,
AD-600 126 DIV. 8

STRUCTURAL SHELLS
BUCKLING (MECHANICS)
LARGE DISPLACEMENT ANALYSIS OF BUCKLING OF AXIALLY COMPRESSED CIRCULAR CYLINDRICAL SHELLS,
AD-600 659 DIV. 25

STRUCTURAL SHELLS
CREEP
STRESS CONCENTRATION IN NON-LINEAR CREEP OF A SIMPLE CYLINDRICAL SHELL,
AD-600 082 DIV. 25

STRUCTURAL SHELLS
PARABOLIC BODIES
MATHEMATICAL ANALYSIS OF DISTORTIONS AND STRESSES OF PARABOLOIDAL SURFACE STRUCTURES,
AD-600 125 DIV. 25

STRUCTURES
LOADING (MECHANICS)
CELLULAR ALUMINUM FOR USE IN ENERGY DISSIPATION SYSTEMS,
AD-600 112 DIV. 17

STRUCTURES
STRESSES
RESEARCH ON THE PHOTOELECTRIC DETERMINATION OF STRESSES DUE TO THE DEAD WEIGHT IN PLANE STRUCTURES,
AD-600 687 DIV. 25

STYRENE PLASTICS
SYNTHESIS (CHEMISTRY)
POLY-(TETRAMETHYL-P-SILPHENYLENE) SILOXANES; STAR- AND COMB-TYPE POLYSTYRENES; FORCED OSCILLATION TORSION PENDULUM; NOVEL INORGANIC POLYMERS; IRRADIATED MYLAR,
AD-600 249 DIV. 14

SUBMARINE HULLS
STEEL
FEASIBILITY OF DEVELOPING AN HY-180/210 WELDMENT,
AD-600 792 DIV. 17
BASE-METAL EVALUATION OF A PRODUCTION ELECTRIC-FURNACE HEAT OF 5NI-CR-MO-V STEEL,
AD-600 793 DIV. 17
HIGHER-STRENGTH STEEL WELDMENTS FOR SUBMARINE HULLS,
AD-600 794 DIV. 17
SUBMARINE VISIBILITY AND RELATED AMBIENT LIGHT STUDIES,
AD-600 836 DIV. 6

SUBMARINES
VISIBILITY
SUBMARINE VISIBILITY AND RELATED AMBIENT LIGHT STUDIES,
AD-600 836 DIV. 6

SUBMINIATURE ELECTRONIC EQUIPMENT
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE FOR MULTILAYER PRINTED WIRING BOARD,
AD-600 120 DIV. 8

SUPERAERODYNAMICS
KINETIC THEORY
A STATE-OF-THE-ART SURVEY OF SOME ASPECTS OF THE MECHANICS OF RAREFIED GASES AND PLASMAS,
AD-600 873 DIV. 25

SUPERAERODYNAMICS
NUMERICAL ANALYSIS
NUMERICAL METHODS FOR COMPUTING THE DENSITY OF A RAREFIED GAS ABOUT A MOVING OBJECT,
AD-600 401 DIV. 9

SUPERCONDUCTORS
QUANTUM MECHANICS
QUANTIZER; DEVICE FOR TRAPPING AND DETECTING QUANTUM VALUES OF FLUX,
AD-600 177 DIV. 25

SUPERSONIC FLOW
LAMINAR FLOW
SUPERSONIC SEPARATED AND REATTACHING LAMINAR FLOWS; I, GENERAL THEORY AND APPLICATION TO ADIABATIC BOUNDARY LAYER-SHOCK WAVE INTERACTIONS,
AD-600 097 DIV. 9

SUPERSONIC FLOW
PRESSURE
CIRCUMFERENTIAL PRESSURE DISTRIBUTION ON AN INCLINED BODY OF REVOLUTION,
AD-600 138 DIV. 9

SUPPRESSORS
DESIGN
COMMUNICATIONS INTERFERENCE REDUCTION STUDIES,
AD-600 020 DIV. 8

SURFACES
FINISHES & FINISHING
ANALYSIS OF POPPET VALVES FOR ROCKET MOTORS AND DESIGN DATA FOR SEATINGS,
AD-600 420 DIV. 27

SURFACES
TRANSPORT PROPERTIES
EQUILIBRIUM AND KINETIC MORPHOLOGY AND STRUCTURE OF SOLID SURFACES,
AD-600 729 DIV. 25

SURGERY
GERM-FREE ATMOSPHERES
DESCRIPTION OF CONSTRUCTION, INSTALLATION, AND MAINTENANCE OF A GERM-FREE OPERATING ROOM,
AD-600 721 DIV. 14

SWEPT-BACK WINGS
LIFT
AN ASYMPTOTIC METHOD FOR DETERMINING THE LIFT DISTRIBUTION OF A SWEPT-BACK WING OF FINITE SPAN,
AD-600 422 DIV. 9

SYMPOSIA
ALL-WEATHER AVIATION
INTERNATIONAL AVIATION R AND D SYMPOSIUM (2ND); ALL WEATHER LANDING SYSTEMS; SEPTEMBER 16-18, 1963,
AD-600 093 DIV. 1

SYMPOSIA
ATMOSPHERE
SEMINARS ON THE STRATOSPHERE, MESOSPHERE AND POLAR METEOROLOGY,
AD-600 664 DIV. 2

SYNCHROS
PHASE-LOCKED SYSTEMS
SYNCHRONOUS RECEIVER STUDIES FOR RE-ENTRY VEHICLES -PHASE LOCK LOOP,
AD-600 682 DIV. 8

SYSTEMS ENGINEERING
DATA PROCESSING SYSTEMS
DATA SYSTEMS; DIGITAL COMPUTERS, COMPUTER COMPONENTS, COMPILERS AND INFORMATION STORAGE AND RETRIEVAL,
AD-600 838 DIV. 30

SYSTEMS ENGINEERING
REENTRY VEHICLES
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM SUBSYSTEM DESIGN ANALYSIS,
AD-600 638 DIV. 12

S-HETEROCYCLIC COMPOUNDS
MOLECULAR STRUCTURE
STRUCTURE OF AN ANOMALOUS C5H10N2S0 HETEROCYCLIC INTERMEDIATE,
AD-600 434 DIV. 4

TABLES
FUNCTIONS
TABLES OF REGULAR AND LOGARITHMIC COULOMB WAVE FUNCTIONS AND TABLES OF GAMMA FUNCTIONS,
AD-600 284 DIV. 25

TACTICAL WEAPONS
OPERATIONS RESEARCH
SOME PROBLEMS INVOLVING CIRCULAR AND SPHERICAL TARGETS,
AD-600 566 DIV. 15

TAR
CREOSOTE
ANALYSIS OF THE WOOD PRESERVATIVES, CREOSOTE AND COAL TAR, IN TEST PANELS EXPOSED TO A MARINE ENVIRONMENT,
AD-600 565 DIV. 14

TARGET POSITION INDICATORS

PREDICTIONS OF SIGHTING RANGE BASED UPON MEASUREMENTS OF TARGET AND ENVIRONMENTAL PROPERTIES,
AD-600 855 DIV. 6

TARGETS
METALS
REVIEW AND ANALYSIS OF EXPERIMENTAL DATA APPLICABLE TO THE IMPACT OF HIGH VELOCITY PROJECTILES WITH SEMI-INFINITE METAL TARGETS,
AD-600 668 DIV. 22

TARGETS
POSITION FINDING
PREDICTIONS OF SIGHTING RANGE BASED UPON MEASUREMENTS OF TARGET AND ENVIRONMENTAL PROPERTIES,
AD-600 855 DIV. 6

TARGETS
SPHERES
SOME PROBLEMS INVOLVING CIRCULAR AND SPHERICAL TARGETS,
AD-600 566 DIV. 15

TAXIING
NAVIGATIONAL LIGHTS
EVALUATION OF AIRFIELD TAXIWAY CENTERLINE LIGHTING FOR LOW VISIBILITY OPERATIONS,
AD-600 775 DIV. 1

TEETH
DISEASES
CAUSE OF INHIBITION OF DENTAL CARIES BY ALKALINE DIET AND THE CARIOSTATIC EFFECTS OF ADDING TRACE ELEMENTS TO THE DIET,
AD-600 104 DIV. 16

TELEMETER SYSTEMS
PERFORMANCE (ENGINEERING)
METHODS AND RESULTS OF TESTING A PCM/PS TELEMETRY SYSTEM UNDER SIMULATED ADVERSE CONDITIONS,
AD-600 633 DIV. 8

TELEMETER SYSTEMS
SOUNDING ROCKETS
SUPPORT OF THE UPPER AIR ROCKET RESEARCH PROGRAM,
AD-600 269 DIV. 4

TELEMETERING DATA
REDUNDANT COMPONENTS
DEVICE FOR THE REDUCTION OF REDUNDANCY IN PULSE CODE MODULATED TELEMETRY DATA,
AD-600 766 DIV. 8

TELESCOPES
SCIENTIFIC RESEARCH
BALLOON PROJECT; SECOND FLIGHT OF STRATOSCOPE II AND RELATED DATA,
AD-600 410 DIV. 2

TERMINAL FLIGHT FACILITIES
LIGHTING EQUIPMENT
EVALUATION OF AIRFIELD TAXIWAY CENTERLINE LIGHTING FOR LOW VISIBILITY OPERATIONS,
AD-600 775 DIV. 1

TERMINAL FLIGHT FACILITIES
WEATHER FORECASTING
CONFIGURATION OF WEATHER FACILITIES FOR METROPLEX TERMINAL AREAS,
AD-600 108 DIV. 1

TEST EQUIPMENT
DROP TESTING
MECHANISM OF EXPLOSION INITIATIONS IN THE STANDARD IMPACT SENSITIVITY TESTER,
AD-600 603 DIV. 10

TEST EQUIPMENT
TEST METHODS
FLEXIBLE PAVEMENT DESIGN FOR AIRFIELDS,
AD-600 511 DIV. 13

TEST EQUIPMENT (ELECTRONICS)

DEVICE FOR THE REPRODUCTION AND MEASUREMENT OF SHORT TIME INTERVALS, UMPV-2,
AD-600 486 DIV. 8

TEST EQUIPMENT (ELECTRONICS)
GUIDED MISSILES
VANDENBERG AFB GROUND ELECTRONIC SYSTEM TEST PLAN FOR MS-133B MINUTEMAN
AD-600 621 DIV. 12

TEST FACILITIES
HEAT TRANSFER
TECHNIQUE FOR SEVERE RADIATIVE AND CONVECTIVE HEATING ENVIRONMENTS FOR MATERIALS EVALUATION,
AD-600 021 DIV. 9

TEST FACILITIES
SANDWICH CONSTRUCTION
PERFORMANCE OF BUILDING CONSTRUCTED OF SANDWICH PANELS AT FOREST PRODUCTS LABORATORY, WISCONSIN,
AD-600 869 DIV. 13

TEST FACILITIES
SHOCK TUBES
SHOCK TUNNEL EXPERIMENTAL TECHNIQUES FOR FORCE AND MOMENT AND SURFACE FLOW DIRECTION MEASUREMENTS,
AD-600 667 DIV. 9

ACOUSTIC SPECIFICATION OF SPEECH! SPEECH TRANSMISSION LABORATORY, STOCKHOLM, SWEDEN, ANNUAL REPORT,
AD-600 865 DIV. 8

SPEECH
LANGUAGE
LINGUISTICS BRAIN RESEARCH AND SPEECH PATHOLOGY,
AD-600 495 DIV. 14

SPEECH
MODELS (SIMULATIONS)
SUMMARY OF RESEARCH ON SPEECH ANALYSIS AND SYNTHESIS,
AD-600 435 DIV. 14

SPEECH COMPRESSION
VOICE COMMUNICATION SYSTEMS SPECTRA OF VOCODER CHANNEL SIGNALS,
AD-600 185 DIV. 5

SPEECH RECOGNITION
SOUND SIGNALS
LINGUISTIC AND ENGINEERING ASPECTS OF AUTOMATIC SPEECH RECOGNITION,
AD-600 494 DIV. 14

SPEECH TRANSMISSION
AMPLITUDE MODULATION
INFINITE PEAK CLIPPING, A TECHNIQUE FOR PROCESSING SPEECH AND OTHER SIGNALS,
AD-600 863 DIV. 8

SPIRAL ANTENNAS
DESIGN
FERRITE-FILLED RECTANGULAR SLOT AND LOG CONICAL SPIRAL UHF-VHF ANTENNAS,
AD-600 557 DIV. 8

SPIRAL ANTENNAS
OPTIMIZATION
STUDY AND INVESTIGATION OF A UHF-VHF ANTENNA,
AD-600 116 DIV. 8

SPUTTERING
SEMICONDUCTORS
ULTRA HIGH VACUUM SPUTTERING TECHNIQUES FOR THE FORMATION OF THIN SEMICONDUCTOR FILMS,
AD-600 799 DIV. 25

STAINLESS STEEL
CORROSION
THE COMPATIBILITY OF WELDED STRUCTURAL MATERIALS WITH CHLORINE TRIFLUORIDE, PERCHLORYL FLUORIDE AND A MIXTURE OF THESE,
AD-600 000 DIV. 17

STAR TRACKERS
FEASIBILITY STUDIES
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED REENTRY VEHICLE PROGRAM, STAR TRACKER,
AD-600 637 DIV. 12

STARS
SPECTROSCOPY
INVESTIGATION OF O AND B SPECTRA OF STARS,
AD-600 878 DIV. 2

STATISTICAL ANALYSIS
BIVARIATE REGRESSION WHEN BOTH VARIABLES ARE RANDOM,
AD-600 309 DIV. 15
MULTIPLE REGRESSION AND ESTIMATION OF THE MEAN OF A MULTIVARIATE NORMAL DISTRIBUTION,
AD-600 421 DIV. 15

STATISTICAL ANALYSIS
STATISTICAL TESTS
ESTIMATING LOCATION AND SCALE PARAMETERS FROM TRUNCATED SAMPLES,
AD-600 733 DIV. 15

STATISTICAL ANALYSIS
THEOREMS
BISPECTRAL ANALYSIS OF STATIONARY TIME SERIES,
AD-600 448 DIV. 15
BOUNDS FOR THE RANK OF THE SUM OF TWO MATRICES,
AD-600 471 DIV. 15

STATISTICAL DISTRIBUTIONS
MULTIPLE REGRESSION AND ESTIMATION OF THE MEAN OF A MULTIVARIATE NORMAL DISTRIBUTION,
AD-600 421 DIV. 15
ON THE ASYMPTOTIC DISTRIBUTION OF THE LARGEST SAMPLE SPACING,
AD-600 739 DIV. 15

STATISTICAL FUNCTIONS
CORRELATION TECHNIQUES
TATARSKIAN CORRELATION FUNCTION FOR ARBITRARY TURBULENCE CONDITIONS,
AD-600 443 DIV. 8

STATISTICAL FUNCTIONS
DISTRIBUTION THEORY
LIMIT DISTRIBUTIONS OF THE MINIMAX OF INDEPENDENT IDENTICALLY DISTRIBUTED RANDOM VARIABLES,
AD-600 003 DIV. 15

STATISTICAL FUNCTIONS
PROBABILITY
MULTIPLE REGRESSION AND ESTIMATION OF THE MEAN OF A MULTIVARIATE NORMAL DISTRIBUTION,
AD-600 421 DIV. 15

STATISTICAL MECHANICS
IRREVERSIBLE PROCESSES
STATISTICAL MECHANICS AND IRREVERSIBILITY,
AD-600 072 DIV. 4

STATISTICAL PROCESSES
PROBABILITY DENSITIES DEFINED BY THE ZERO-CROSSING POINTS OF THE ENVELOPE OF A SINE WAVE PLUS A GAUSSIAN PROCESS,
AD-600 393 DIV. 15

STATISTICAL TESTS
MATHEMATICAL MODELS
A CLASS OF ESTIMATES IN LINEAR MODELS WITH SEVERAL OBSERVATIONS PER CELL,
AD-600 278 DIV. 15

STEEL
BRITTLENESS
EMBRITTLEMENT OF STEEL BY ORGANIC LIQUIDS,
AD-600 695 DIV. 17

STEEL
CASTING
TENSILE AND IMPACT PROPERTIES OF INVESTMENT CAST STEELS,
AD-600 655 DIV. 22

STEEL
DROP TESTING
DROP-WEIGHT TESTS OF EXPERIMENTAL HY-130/150 STEELS,
AD-600 795 DIV. 17

STEEL
FRACTURE (MECHANICS)
INVESTIGATION OF LOW-CYCLE FATIGUE FAILURES IN LADISH D6A-C STEEL, 6AL-4V TITANIUM AND 18NI(300) MARAGING STEEL BY APPLIED FRACTURE MECHANICS,
AD-600 375 DIV. 17

STEEL
GRAIN STRUCTURES (METALLURGY)
MATERIALS -4340 STEEL -STRESS CORROSION AND EFFECTS OF BANDING -LITERATURE SURVEY, PART III EFFECTS OF BANDING,
AD-600 034 DIV. 17

STEEL
HEAT TREATMENT
STATISTICAL ANALYSIS EVALUATION OF MELTING AND TRANSVERSE PROPERTIES OF HIGH-STRENGTH (M-11 TYPE) STEEL,
AD-600 150 DIV. 17
EFFECTS OF RAPID HEAT TREATMENT ON THE MECHANICAL PROPERTIES OF A S 1/4 NI-CR-MO-V STEEL,
AD-600 791 DIV. 17
BASE-METAL EVALUATION OF A PRODUCTION ELECTRIC-FURNACE HEAT OF 5NI-CR-MO-V STEEL,
AD-600 793 DIV. 17

STEEL
MECHANICAL PROPERTIES
USE OF CHARPY V-NOTCHED-SPECIMEN IMPACT TESTS ON LOW ALLOY STEELS AT HIGH TEMPERATURES,
AD-600 188 DIV. 17
EVALUATION OF AIR MELTED AND VACUUM MELTED AISI 4340 STEEL,
AD-600 727 DIV. 17
FEASIBILITY OF DEVELOPING AN HY-180/210 WELDMENT,
AD-600 792 DIV. 17
HIGHER-STRENGTH STEEL WELDMENTS FOR SUBMARINE HULLS,
AD-600 794 DIV. 17
INFLUENCE OF SECTION SIZE ON THE MECHANICAL PROPERTIES AND FRACTURE TOUGHNESS OF 7075-T6 ALUMINUM, 6AL-6V-2SN TITANIUM, AND AISI 4340 STEEL,
AD-600 846 DIV. 17

STEEL
RODS
EFFECTS OF COLD-DRAWING ON THE MECHANICAL PROPERTIES OF STEEL RODS,
AD-600 404 DIV. 17

STEEL
STRENGTH
EFFECT OF VARYING COBALT CONTENT FROM 0 TO 8 PERCENT ON THE STRENGTH AND TOUGHNESS OF 5NI-1,5CR-0,5MO STEELS CONTAINING EITHER 0,18 OR 0,25 PERCENT CARBON,
AD-600 790 DIV. 17

STEEL
TOUGHNESS
INVESTIGATION OF FRACTURE TOUGHNESS IN HIGH STRENGTH ALLOYS,
AD-600 008 DIV. 17

STEREOCHEMISTRY
BENZOATES
ADDITION AND DISPLACEMENT REACTIONS WITH UNSATURATED HYDROCARBONS,
AD-600 223 DIV. 4

STIMULATION
EXCRETION
VOLUME CONDITIONED STIMULI AFFECTING SALT AND WATER EXCRETION,
AD-600 342 DIV. 16

STIMULATION
MEMBRANES
GENESIS OF ACTION POTENTIAL IN EXCITABLE TISSUES,
AD-600 343 DIV. 16

STOCHASTIC PROCESSES
OPTIMAL ADAPTIVE ESTIMATION OF SAMPLED STOCHASTIC PROCESSES,
AD-600 600 DIV. 15

STORAGE
HUMIDITY
SURVEY OF LITERATURE ON DEHUMIDIFICATION AND DEHUMIDIFIED STORAGE IN WAREHOUSES,
AD-600 561 DIV. 26
EVALUATION OF U. S. NAVAL DEHUMIDIFIED WAREHOUSE PROGRAM,
AD-600 562 DIV. 26

STORAGE
MATERIALS
DETERIORATION OF MATERIALS IN STORAGE AND RECOMMENDED STORAGE CONDITIONS,
AD-600 560 DIV. 14
BIBLIOGRAPHY ON PRESERVATION OF INACTIVE EQUIPMENT AND LONG-TERM STORAGE OF MATERIALS,
AD-600 642 DIV. 18

STORAGE BATTERIES
DESIGN
DEVELOPMENT OF THE SEALED ZINC-SILVER OXIDE SECONDARY BATTERY SYSTEM,
AD-600 395 DIV. 7

STORAGE BATTERIES
MATERIALS
INVESTIGATIONS LEADING TO THE DESIGN OF A RELIABLE SEALED NICKEL-CADMIUM CELL,
AD-600 251 DIV. 7

STORAGE TUBES
COLORS
RESEARCH AND DEVELOPMENT OF TWO-COLOR DIRECT VIEW STORAGE TUBE WITH SELECTIVE ERASURE,
AD-600 385 DIV. 8

STORMS
COSMIC RAYS
SPECTRAL VARIATIONS DURING COSMIC RAY STORMS IN THE INTERNATIONAL GEOPHYSICAL YEAR,
AD-600 367 DIV. 2

STRAIN GAGES
REVIEWS
WIRE-RESISTANCE STRAIN GAGES AND THEIR APPLICATION,
AD-600 040 DIV. 30

STRESSES
CYLINDRICAL BODIES
STRESS CONCENTRATION IN NON-LINEAR CREEP OF A SIMPLE CYLINDRICAL SHELL,
AD-600 082 DIV. 28

STRESSES
MATHEMATICAL ANALYSIS
EXPERIMENTAL SOLUTION OF SOME MIXED BOUNDARY VALUE PROBLEMS USING TWO MODELS,
AD-600 546 DIV. 15

STRESSES
PHOTOELECTRICITY
RESEARCH ON THE PHOTOELECTRIC DETERMINATION OF STRESSES DUE TO THE DEAD WEIGHT IN PLANE STRUCTURES,
AD-600 687 DIV. 25

STRESSES (PSYCHOLOGY)
AVIATION PERSONNEL
ACCURACY OF THE AZON GUIDED BOMB UNDER WW II COMBAT CONDITIONS HUMAN FACTORS,
AD-600 601 DIV. 12

STRONTIUM
HALF LIFE
DECAY CHARACTERISTICS OF Sr93 AS DETERMINED

IN THE TRACKING OF MISSILES AND SPACE VEHICLES,
AD-600 656 DIV. 12

TRACKING
ANTENNA CONFIGURATIONS
HIGH GAIN ANTENNA REALIZATION AND TRACKING STUDY, UTILIZING PHASED ARRAY PARABOLIC ANTENNAS,
AD-600 651 DIV. 8

TRACKING
DISCRIMINATORS
PERFORMANCE OF THE BINARY DELAY-LOCK TRACKING DISCRIMINATOR AS EVALUATED FROM LABORATORY-SIMULATED ENVIRONMENTS,
AD-600 599 DIV. 6

TRACKING
OPERATORS (PERSONNEL)
RESEARCH ON ELBOW PROSTHETICS, HUMAN TRACKING SENSORY MOTOR CONTROL, AND MYOELECTRIC CONTROL,
AD-600 333 DIV. 14

TRAINING
PERFORMANCE TESTS
EFFECTS OF PAIRING TIME AND TEST TIME ON PERFORMANCE DURING AND AFTER PAIRED-ASSOCIATE TRAINING,
AD-600 647 DIV. 28

TRAINING DEVICES
FIRE CONTROL SYSTEMS
DESIGN AND DEVELOPMENT OF THE AN/ASG21-T1 FIRE CONTROL SYSTEM TRAINER,
AD-600 834 DIV. 8

TRAJECTORIES
PLOTTERS
CHARTS FOR DETERMINING THE CHARACTERISTICS OF BALLISTIC VEHICLES TRAVELING IN A VACUUM ABOUT A NONROTATING, SPHERICAL EARTH,
AD-600 087 DIV. 22

TRANSFER OF TRAINING
PSYCHOMETRICS
ISOLATION EFFECTS WHEN PAIRED-ASSOCIATES ARE PRESENTED SERIALLY,
AD-600 648 DIV. 28

TRANSFORMATIONS (MATHEMATICS)
VON ZEIPEL PERTURBATION METHOD FOR FINDING AN APPROXIMATE SOLUTION TO DIFFERENTIAL EQUATIONS SUCH AS OCCUR IN NONLINEAR MECHANICS,
AD-600 413 DIV. 25

TRANSIENTS
LOOP ANTENNAS
EXPERIMENTAL INVESTIGATIONS ON THE TRANSIENT RESPONSE CHARACTERISTICS OF RECTANGULAR LOOP ANTENNAS,
AD-600 797 DIV. 8

TRANSISTORS
GERMANIUM
ENGINEERING SERVICES ON TRANSISTOR
AD-600 099 DIV. 8

TRANSISTORS
IMPURITIES
CAPACITANCE-VOLTAGE DEPENDANCE OF ZINC-DIFFUSED GAAS P-N JUNCTIONS, NON-LINEARITY OF THE IMPURITY DISTRIBUTION NEAR THE JUNCTION,
AD-600 696 DIV. 8

TRANSISTORS
PERFORMANCE (ENGINEERING)
TRANSISTOR CHARACTERIZATION AND ACTIVE NETWORK STUDIES
AD-600 001 DIV. 8
TRANSISTOR CHARACTERIZATION AND DERATING FOR SECOND BREAKDOWN,
AD-600 142 DIV. 8

TRANSISTORS
RELIABILITY
PRODUCTION ENGINEERING MEASURES; TRANSISTOR LIFE EXPECTANCY TESTS TO DETERMINE RELIABILITY,
AD-600 864 DIV. 8

TRANSISTORS
RELIABILITY (ELECTRONICS)
PRODUCTION ENGINEERING MEASURES TO INCREASE TRANSISTOR RELIABILITY,
AD-600 283 DIV. 8
DESIGN, HIGH VOLTAGE CAPABILITY, AND ENCAPSULATION OF A 500 WATT SILICON POWER TRANSISTOR,
AD-600 480 DIV. 8

TRANSISTORS
SILICON ALLOYS
PRODUCTION ENGINEERING MEASURES FOR THE RELIABILITY IMPROVEMENT OF SILICON ALLOY TRANSISTORS,
AD-600 024 DIV. 8
PRODUCTION ENGINEERING MEASURE; RELIABILITY IMPROVEMENT; SILICON ALLOY TRANSISTOR, VOLUME III; PROCESS SPECIFICATION MANUAL,
AD-600 025 DIV. 8
PRODUCTION ENGINEERING MEASURE; RELIABILITY IMPROVEMENT; SILICON ALLOY TRANSISTOR, VOLUME IIII; QUALITY CONTROL MANUAL,
AD-600 026 DIV. 8

TRANSISTORS
SURFACES
DELETERIOUS SURFACE PHENOMENA EFFECTS ON SILICON TRANSISTORS,
AD-600 873 DIV. 8

TRANSPARENT PANELS
HEAT TRANSFER
DESCRIBING MATERIALS, TRANSPARENT, SEMI-TRANSPARENT AND TRANSLUCENT AND THEIR THERMAL RADIATION CHARACTERISTICS
AD-600 370 DIV. 14

TRANSPLANTATION
CELLS (BIOLOGY)
IMMUNOLOGICAL, BIOLOGICAL AND CYTOLOGICAL PROPERTIES OF MALIGNANT TUMORS IN HETEROTRANSPLANTATION AND EXPLANTATION,
AD-600 787 DIV. 14

TRANSPONDERS
HEIGHT FINDING
SLATE III AND SLATE III MARK I LIGHT-WEIGHT ALTITUDE TRANSMISSION TRANSPONDERS,
AD-600 822 DIV. 1

TRANSPORT PLANES
AERODYNAMIC LOADING
STRUCTURAL FLIGHT LOADS DATA FROM C-130 AIRCRAFT,
AD-600 470 DIV. 1

TRAVELING WAVE TUBES
DESIGN
GRIDDED 100 KW L-BAND TRAVELLING-WAVE TUBES FOR PULSED ARRAY RADAR SYSTEMS,
AD-600 312 DIV. 8

TRAVELING WAVE TUBES
RELIABILITY (ELECTRONICS)
FAILURE MECHANISMS IN TRAVELING WAVE TUBES,
AD-600 522 DIV. 8

TRAVELING-WAVE TUBES
INVESTIGATION OF LARGE-SIGNAL TRAVELING-WAVE TUBES,
AD-600 837 DIV. 8

TREES
RINGS
PATTERN OF VARIATION OF FIBRIL ANGLE WITHIN ANNUAL RINGS OF PINUS ATTENURADIATA,
AD-600 857 DIV. 32

TRIODES
AMPLIFIERS
TRANSIENT GAMMA AND NEUTRON RADIATION EFFECTS ON BASIC TRIODE AMPLIFIERS,
AD-600 770 DIV. 8

TROPICAL REGIONS
CLIMATOLOGY
TEMPERATURE AND HUMIDITY REGIMES IN THE ZONE BETWEEN 35 DEGREES N AND 35 DEGREES S,
AD-600 318 DIV. 2

TROPOPAUSE
CUMULONIMBUS CLOUDS
TROPOPAUSE PENETRATIONS BY CUMULONIMBUS CLOUDS,
AD-600 819 DIV. 2

TUNGSTEN
MECHANICAL PROPERTIES
MECHANICAL AND PHYSICAL PROPERTIES OF TZM MOLYBDENUM ALLOY SHEET AND TUNGSTEN SHEET PRODUCED IN PHASE I OF THE REFRACTORY METAL SHEET ROLLING PROGRAM,
AD-600 281 DIV. 17

TUNGSTEN ALLOYS
DUCTILITY
DEVELOPMENT OF A DUCTILE TUNGSTEN BASE SHEET ALLOY,
AD-600 764 DIV. 17

TUNGSTEN ALLOYS
METALLOGRAPHY
DEVELOPMENT AND EVALUATION OF TUNGSTEN-BASE ALLOYS PREPARED BY THE VACUUM-ARC-CASTING PROCESS,
AD-600 584 DIV. 17

TUNGSTEN ALLOYS
RECRYSTALLIZATION
PROCESSING NIOBIUM-TUNGSTEN ZIRCONIUM ALLOY SHEET BARS TO SHEETS,
AD-600 403 DIV. 17

TUNNEL DIODES
X BAND
HIGH BURNOUT-RESISTANT X-BAND TUNNEL DIODES FOR COUNTERMEASURES EQUIPMENT,
AD-600 535 DIV. 8

TUNNELING (ELECTRONICS)
CATHODES
ACHIEVEMENT OF LOW NOISE MICROWAVE AMPLIFICATION BY USE OF TUNNELING,
AD-600 589 DIV. 8

TURBINE BLADES
COOLING
ANALOG STUDY OF THE EFFECT OF THERMAL CONDUCTIVITY OF A MATERIAL ON THE HEAT IN A TURBINE BLADE,
AD-600 609 DIV. 27

TURBINES
GUIDE VANES
BLADELESS GUIDE VANE FOR CENTRIPETAL TURBINES,
AD-600 608 DIV. 27

TURBULENCE
THEORY
TURBULENT MIXING OF COAXIAL FLOWS IN A CHANNEL OF CONSTANT CROSS SECTION,
AD-600 237 DIV. 9

TURBULENT BOUNDARY LAYER
NUMERICAL ANALYSIS
DISCUSSION OF NESS'S ANALYSIS FOR A TURBULENT BOUNDARY LAYER WITH MASS ADDITION,
AD-600 627 DIV. 9

TURBULENT BOUNDARY LAYER
SOUND
SURFACE AND VOLUME SOUND FROM TURBULENT BOUNDARY LAYERS,
AD-600 476 DIV. 9

TWO-DIMENSIONAL FLOW
THEORY
LINEARIZED THEORY OF TWO-DIMENSIONAL CAVITY FLOWS,
AD-600 144 DIV. 9

ULTRASONIC RADIATION
METALLIC CRYSTALS
ULTRASONIC EFFECTS ON DEFORMATION CHARACTERISTICS OF METALS,
AD-600 383 DIV. 17

ULTRASONIC RADIATION
PROPAGATION
PROPAGATION VELOCITY OF ULTRASONIC WAVES IN SOLIDS,
AD-600 813 DIV. 14

ULTRASONIC RADIATION
WIRE
APPLICATION OF ULTRASONICS TO WIRE DRAWING, EFFECTS OF ULTRASONIC ENERGY ON THE MECHANISM OF PLASTIC FLOW, RESULTING METAL STRUCTURE, AND PROPERTIES,
AD-600 706 DIV. 26

UNDERWATER
CONSTRUCTION
FACTORS INVOLVED IN RECONNAISSANCE AND POSITIONING FOR A DEEP-OCEAN CONSTRUCTION SITE,
AD-600 305 DIV. 13
INFORMATION ON ENVIRONMENTS, SYSTEMS, AND TECHNIQUES RELATIVE TO CONSTRUCTION IN DEEP OCEAN AREAS,
AD-600 306 DIV. 13
DEEP-OCEAN ENVIRONMENTAL KNOWLEDGE PERTAINING TO OCEANOGRAPHIC DATA,
AD-600 307 DIV. 13

UNDERWATER OBJECT LOCATORS
UNDERWATER LIGHT
SUBMARINE VISIBILITY AND RELATED AMBIENT LIGHT STUDIES,
AD-600 856 DIV. 6

UPPER ATMOSPHERE
ATMOSPHERE MODELS
SEMI-THEORETICAL MODEL FOR ATMOSPHERIC PROPERTIES FROM 90 TO 10,000 KM,
AD-600 472 DIV. 2

UPPER ATMOSPHERE
SPACE ENVIRONMENTAL CONDITIONS
PHENOMENA IN THE UPPER ATMOSPHERE; COMPILATION OF ABSTRACTS FROM SOVIET-BLOC LITERATURE,
AD-600 050 DIV. 2
PHENOMENA IN THE UPPER ATMOSPHERE; COMPILATION OF ABSTRACTS,
AD-600 051 DIV. 2

VACCINES
PASTEURELLA TULARENSIS
BRIEF EVALUATION OF A SURVEY OF SOVIET LITERATURE ON TULAREMIA,
AD-600 569 DIV. 14

VACUUM EQUIPMENT
CONSTRUCTION
DEPOSITION AND EVALUATION OF EXPITAXIAL FILMS ON SINGLE CRYSTAL SUBSTRATES,
AD-600 149 DIV. 25

TEST METHODS
MILITARY REQUIREMENT
PRODUCTION ACCEPTANCE TESTING OF CABLE SPLICE CASES FOR MINUTEMAN INTERSITE COMMUNICATIONS SYSTEMS,
AD-600 716 DIV. 12

TETRODES
CERAMIC MATERIALS
PRODUCTION TECHNIQUES FOR ASSEMBLING AND TESTING THE Z-5267 CERAMIC TETRODE,
AD-600 384 DIV. 8

TETRYL
DETONATIONS
ANALYSIS OF THE OPTICAL DETERMINATION OF DETONATION VELOCITY IN SHORT CHARGES,
AD-600 059 DIV. 22

THALAMUS
ESTROGENS
EFFECT OF OVARIAN HORMONES ON THE ACTIVITY OF HYPOTHALAMIC NEURONES,
AD-600 381 DIV. 16

THALAMUS
STIMULATION
EFFECTS OF STIMULATION OF VASADILATOR CENTERS OF HYPOTHALAMUS ON THE BLOOD FLOW IN THE FEMORAL ARTERIES OF DOGS,
AD-600 380 DIV. 16

THERMAL CONDUCTIVITY
NUMERICAL ANALYSIS
ANALOG STUDY OF THE EFFECT OF THERMAL CONDUCTIVITY OF A MATERIAL ON THE HEAT IN A TURBINE BLADE,
AD-600 409 DIV. 27

THERMAL NEUTRONS
NEUTRON DETECTORS
BORON, LITHIUM, OR URANIUM COVERED SILICON THERMAL NEUTRON DETECTORS,
AD-600 583 DIV. 20

THERMIONIC CONVERTERS
DESIGN
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM, SOLAR THERMAL ENERGY SOURCES,
AD-600 636 DIV. 12

THERMIONIC CONVERTERS
HEATING
WICK BURNER FOR THERMIONIC GENERATORS,
AD-600 314 DIV. 8

THERMIONIC CONVERTERS
PLASMA PHYSICS
PLASMA PROPERTIES IN A THERMIONIC CONVERTER,
AD-600 096 DIV. 8

THERMOCOUPLE PYROMETERS
DESIGN
TEMPERATURE-COMPENSATED-THERMOCOUPLE REFERENCE CIRCUIT USED FOR MEASURING TEMPERATURE DURING MISSILE FLIGHT TESTS,
AD-600 675 DIV. 30

THERMODYNAMICS
EQUATIONS OF STATE
NOTE ON A PAPER BY SLIEPCEVICH AND FINN,
AD-600 073 DIV. 4

THERMODYNAMICS
GAS FLOW
GENERALIZED VELOCITY POTENTIAL EQUATION FOR PLURI-REACTING MIXTURES,
AD-600 098 DIV. 9

THERMODYNAMICS
STATISTICAL MECHANICS
STATISTICAL MECHANICS AND IRREVERSIBILITY,
AD-600 072 DIV. 4

THERMOELECTRICITY
GENERATORS
THERMOELECTRIC POWER MODULES,
AD-600 365 DIV. 7

THIN FILMS (STORAGE DEVICES)
TECHNIQUES AND APPARATUS FOR EVAPORATING COMPOUND SEMICONDUCTORS, THIN FILMS OF INDIUM ANTIMONIDE AND INDIUM ARSENIDE,
AD-600 676 DIV. 25

THREE-DIMENSIONAL FLOW
LAMINAR BOUNDARY LAYER
APPROXIMATION METHOD OF COMPUTING THE THREE-DIMENSIONAL LAMINAR BOUNDARY LAYER,
AD-600 824 DIV. 9

TIME
REPRODUCTION
DEVICE FOR THE REPRODUCTION AND MEASUREMENT OF SHORT TIME INTERVALS, UMPV-2,
AD-600 484 DIV. 8

TIME DELAY FUZES
MAGNETIC CORES
A MAGNETIC CORE ARMING PROGRAMMER FOR THE COPPERHEAD II FUZE SYSTEM,
AD-600 445 DIV. 22

TIME STUDIES
CUTTING TOOLS
NOPP STANDARD TIME FORMULA S-1 REPORT FOR OPERATING POWER SHEARS,
AD-600 204 DIV. 26

TIME STUDIES
ELECTROPLATING
NOPP STANDARD TIME FORMULA FOR ANODIZE OPERATION TIME STUDIES,
AD-600 190 DIV. 26

TIME STUDIES
GRINDERS
NOPP STANDARD TIME FORMULA GR-S REPORT FOR CENTERLESS GRINDER OPERATION TIME STUDIES,
AD-600 194 DIV. 26
NOPP STANDARD TIME FORMULA GR-2 FOR INTERNAL GRINDING OPERATION TIME STUDIES,
AD-600 197 DIV. 26
NOPP STANDARD TIME FORMULA GRH FOR MATTISON SURFACE GRINDER OPERATION TIME STUDIES,
AD-600 198 DIV. 26

TIME STUDIES
JIGS
NOPP STANDARD TIME FORMULA F-1 FOR JIG OPERATION TIME STUDIES,
AD-600 196 DIV. 26

TIME STUDIES
LATHES
NOPP STANDARD TIME FORMULA VTL-1 REPORT FOR VERTICAL TURRET LATHE,
AD-600 208 DIV. 26
NOPP STANDARD TIME FORMULA TL-1 REPORT FOR W AND S NO. 3 TURRET LATHE,
AD-600 209 DIV. 26

TIME STUDIES
MACHINE SHOP PRACTICE
NOPP STANDARD TIME FORMULA M.A.D. FOR ASSEMBLY OPERATION TIME STUDIES,
AD-600 192 DIV. 26

TIME STUDIES
MACHINE TOOLS
NOPP STANDARD TIME FORMULA REPORT FOR ARTOS WIRE STRIPPING MACHINE,
AD-600 191 DIV. 26
NOPP STANDARD TIME FORMULA GR-8 REPORT FOR CENTER LAPPING OPERATION TIME STUDIES,
AD-600 193 DIV. 26
NOPP STANDARD TIME FORMULA SM-27 FOR METAL FABRICATOR OPERATION TIME STUDIES,
AD-600 199 DIV. 26
NOPP STANDARD TIME FORMULA WS-1 REPORT FOR WALES-STRIPPIT FABRICATOR MOD 10-A,
AD-600 210 DIV. 26

TIME STUDIES
MATERIAL FORMING
NOPP STANDARD TIME FORMULA PF-1 REPORT FOR PIPE FABRICATING,
AD-600 203 DIV. 26

TIME STUDIES
MILLING MACHINES
NOPP STANDARD TIME FORMULA M-1 REPORT FOR MILLING MACHINE OPERATION TIME STUDIES,
AD-600 200 DIV. 26
NOPP STANDARD TIME FORMULA M-3 REPORT FOR MILLING MACHINE OPERATION TIME STUDIES,
AD-600 201 DIV. 26
NOPP STANDARD TIME FORMULA M-6 REPORT FOR MILWAUKEE SIMPLEX MILL,
AD-600 202 DIV. 26
NOPP STANDARD TIME FORMULA M-4 REPORT FOR SPLINE MILL,
AD-600 206 DIV. 26
NOPP STANDARD TIME FORMULA M-5 REPORT FOR THREAD MILLING,
AD-600 207 DIV. 26

TIME STUDIES
PRESSES (MACHINERY)
NOPP STANDARD TIME FORMULA PP-1 REPORT FOR PUNCH PRESS,
AD-600 205 DIV. 26

TIME STUDIES
WELDING
NOPP STANDARD TIME FORMULA MW-1 FOR MANUAL ARC WELDING OPERATION TIME STUDIES,
AD-600 211 DIV. 26

TIME-INTERVAL COUNTERS
DESIGN
DEVICE FOR THE REPRODUCTION AND MEASUREMENT OF SHORT TIME INTERVALS, UMPV-2,
AD-600 484 DIV. 8

TIMING DEVICES
ENERGY
KINETIC ENERGY MEASURING SYSTEM FOR XM5 TIMER,
AD-600 189 DIV. 22

TIMING DEVICES
ORDNANCE
FLUID TIMER FOR ORDNANCE FOR USE IN FUZING, SAFING AND ARMING FUNCTIONS,
AD-600 661 DIV. 22

TIMING DEVICES
STANDARDIZATION
INTER-GUIDED MISSILE RANGE INSTRUMENTATION GROUP STANDARD INSTRUMENTATION TIMING FORMATS,
AD-600 640 DIV. 12

TITANIUM ALLOYS
FRACTURE (MECHANICS)
INVESTIGATION OF LOW-CYCLE FATIGUE FAILURES IN LADISH D6A-C STEEL, 6AL-4V TITANIUM AND 18NI(300) MARAGING STEEL BY APPLIED FRACTURE MECHANICS,
AD-600 375 DIV. 17

TITANIUM ALLOYS
MECHANICAL PROPERTIES
INFLUENCE OF SECTION SIZE ON THE MECHANICAL PROPERTIES AND FRACTURE TOUGHNESS OF 7075-T6 ALUMINUM, 6AL-4V-2SN TITANIUM, AND AISI 4340 STEEL,
AD-600 846 DIV. 17

TOLERANCE (PHYSIOLOGY)
LIPIDS
EFFECT OF LIPASE INGESTION ON BLOOD LIPID LEVELS,
AD-600 533 DIV. 16

TOLERANCES (PHYSIOLOGY)
AIR BURST
EFFECTS OF AMBIENT PRESSURE ON THE TOLERANCE OF MICE TO AIR BLAST,
AD-600 551 DIV. 16

TOLERANCES (PHYSIOLOGY)
ANTIGEN-ANTIBODY REACTIONS
IMMUNILOGICAL EFFECTS OF INJECTIONS OF SPLEEN AND KIDNEY EXTRACTS AGAINST ANTIGENIC REACTIONS FOLLOWING SKIN AND KIDNEY TRANSPLANTS,
AD-600 406 DIV. 16

TOLERANCES (PHYSIOLOGY)
HYPOTHERMIA
TOLERANCE TO PROLONGED DEEP HYPOTHERMIA DURING PERFUSION,
AD-600 594 DIV. 16

TOPOLOGY
THEOREMS
INSOLVABILITY OF THE PROBLEM OF HOMEOMORPHY,
AD-600 501 DIV. 15

TORQUE
STRESSES
APPROXIMATION METHOD FOR THE CALCULATION OF STRESS INCREASES AT THE TRANSITION POINTS OF STEPPED OR GROOVED SHAFTS,
AD-600 689 DIV. 27

TOUGHNESS
HIGH-TEMPERATURE RESEARCH
USE OF CHARPY V-NOTCHED-SPECIMEN IMPACT TESTS ON LOW ALLOY STEELS AT HIGH TEMPERATURES,
AD-600 188 DIV. 17

TOUGHNESS
STEEL
EFFECT OF VARYING COBALT CONTENT FROM 0 TO 8 PERCENT ON THE STRENGTH AND TOUGHNESS OF 5NI-1.5CR-0.5MO STEELS CONTAINING EITHER 0.18 OR 0.25 PERCENT CARBON,
AD-600 790 DIV. 17

TOWED BODIES
TESTS
FIT CHECK AND FLIGHT TEST OF UNIVERSAL AIR REFUELING DROGUE,
AD-600 677 DIV. 1

TRACER STUDIES
MEDICAL EQUIPMENT
ISOTOPE METHOD OF RESEARCH IN A LIVING ORGANISM -A RADIOGRAPH MACHINE WHICH RECORDS GAMMA RADIATION IN A NONLINEAR INTEGRATED FORM CONTINUOUSLY OVER TIME,
AD-600 611 DIV. 16

TRACKING
ABSTRACTS
COMPILATION OF ABSTRACTS REVIEWING SOVIET DEVELOPMENT

GLIDERS
APPROXIMATE ENGINEERING METHOD FOR DETERMINATION OF AERODYNAMIC HEATING OF HYPERSONIC GLIDER WINGS,
AD-600 625 DIV. 1

WIRE
MECHANICAL WORKING
APPLICATION OF ULTRASONICS TO WIRE DRAWING, EFFECTS OF ULTRASONIC ENERGY ON THE MECHANISM OF PLASTIC FLOW, RESULTING METAL STRUCTURE, AND PROPERTIES,
AD-600 706 DIV. 24

WOOD
ANTIFOULING COATINGS
SEA WATER IMMERSION TESTS OF AFRICAN WOOD UNCOATED AND COATED WITH NAVY FORMULA 105 OR 121 ANTIFOULING PAINT,
AD-600 399 DIV. 14

WOOD
MOISTURE
VENEER CUTTING AND DRYING PROPERTIES OF COTTONWOOD
AD-600 849 DIV. 14

WOOD
PLYWOOD
VENEER CUTTING AND DRYING PROPERTIES OF COTTONWOOD
AD-600 849 DIV. 14
ANALYSIS OF THE WOOD PRESERVATIVES, CREOSOTE AND COAL TAR, IN TEST PANELS EXPOSED TO A MARINE ENVIRONMENT,
AD-600 365 DIV. 14

WOOD
PROTECTIVE TREATMENTS
SEA WATER IMMERSION TESTS OF SOUTHERN YELLOW PINE SAPWOOD PANELS IMPREGNATED WITH CELCURE, ERDALITH, CREOSOTE OR 60/40 CREOSOTE-COAL TAR,
AD-600 398 DIV. 14
SEA WATER IMMERSION TESTS OF SOUTHERN YELLOW PINE SAPWOOD PANELS TREATED WITH COPPER SULFONATE UNCOATED AND COATED WITH NAVY FORMULA 105 OR 121 ANTIFOULING PAINT,
AD-600 415 DIV. 14
SEA WATER IMMERSION TESTS OF MAHOGANY PLYWOOD AND RED OAK PANELS TREATED WITH COPPER FORMATE, TRIBUTYL TIN OXIDE AND CELCURE, UNPAINTED AND PAINTED WITH NAVY FORMULA 105 ANTIFOULING PAINT,
AD-600 416 DIV. 14

WOOD PULP
BLEACHING AGENTS
TWO-STAGE NONCHLORINATION BLEACHING OF SEVERAL HARDWOOD NEUTRAL SULFITE SEMICHEMICAL PULPS,
AD-600 851 DIV. 4
LEARNING OF BALANCED AND UNBALANCED SOCIAL STRUCTURES,
AD-600 104 DIV. 28

XENON
GAS IONIZATION
INVESTIGATION OF MAGNETICALLY INDUCED IONIZATION OF XENON USING MHD GENERATORS,
AD-600 531 DIV. 25

X-RAY SPECTROSCOPY
NUCLEAR RADIATION SPECTROMETERS
ULTRA-SOFT X-RAY SPECTROMETER,
AD-600 325 DIV. 25

ZINC COMPOUNDS
VISCOELASTICITY
VISCOELASTICITY OF ZINC PHENYLMETHYL PHOSPHINATE,
AD-600 431 DIV. 4

ZIRCONIUM ALLOYS
DUCTILITY
PROCESSING NIOBIUM-TUNGSTEN ZIRCONIUM ALLOY SHEET BARS TO SHEETS,
AD-600 403 DIV. 17

ZIRCONIUM ALLOYS
NIOBIUM ALLOYS
THE SOLUBILITY OF COLUMBIUM-1% ZIRCONIUM IN SODIUM BY ACTIVATION ANALYSIS,
AD-600 070 DIV. 17

ZIRCONIUM COMPOUNDS
FLUORIDES
MASS SPECTROSCOPIC DETERMINATION OF THE VAPOR PRESSURE OF ZIRCONIUM TETRAFLUORIDE,
AD-600 788 DIV. 4

ZIRCONIUM COMPOUNDS
VAPOR PRESSURE
MASS SPECTROSCOPIC DETERMINATION OF THE VAPOR PRESSURE OF ZIRCONIUM TETRAFLUORIDE,
AD-600 788 DIV. 4

VALVES
CONFIGURATION
ANALYSIS OF POPPET VALVES FOR ROCKET MOTORS AND DESIGN DATA FOR SEATINGS,
AD-600 420 DIV. 27

VANADIUM ALLOYS
REFRACTORY COATINGS
HIGH-TEMPERATURE OXIDATION PROTECTIVE COATINGS FOR VANADIUM-BASE ALLOYS,
AD-600 043 DIV. 17

VAPORIZATION
SOLIDS
FLASH VAPORIZATION OF SOLID MATERIALS FOR MASS SPECTROMETRY BY XENON FLASHTUBE,
AD-600 159 DIV. 25

VARACTOR DIODES
GERMANIUM
SEMICONDUCTOR SWITCHING AND LIMITING USING 3 DB SHORT SLOT (HYBRID) COUPLERS,
AD-600 028 DIV. 8

VECTOR ANALYSIS
OPTIMAL ADAPTIVE ESTIMATION OF SAMPLED STOCHASTIC PROCESSES,
AD-600 600 DIV. 19

VEHICLES
LOADING (MECHANICS)
DESIGN CRITERIA FOR GROUND INDUCED DYNAMIC LOADS FOR VEHICLES OPERATING ON PREPARED SURFACES,
AD-600 867 DIV. 30

VELOCITY
MOTION
DECELERATION AND MASS CHANGE OF AN ABLATING BODY DURING HIGH-VELOCITY MOTION,
AD-600 692 DIV. 9

VERTICAL INDICATORS
RADIATION MEASUREMENT SYSTEMS
THEORETICAL ANALYSIS DEALING WITH THE PHYSICS OF USING THE OXYGEN HORIZON FOR VERTICAL SENSING,
AD-600 783 DIV. 1

VETERINARY MEDICINE
MEDICAL EQUIPMENT
INSTRUMENT FOR RECORDING THE PULSE WAVES AND DETERMINING THE BLOOD PRESSURE IN ANIMALS,
AD-600 148 DIV. 14

VIBRATION
DAMPING
SONIC FATIGUE DAMPING MATERIAL,
AD-600 170 DIV. 1

VIDICONS
PHOTOCONDUCTIVITY
FIELD ASSISTED METHOD OF INCREASING THE SENSITIVITY OF A VIDICON TARGET WHICH INCLUDES A THIN INSULATOR LAYER,
AD-600 434 DIV. 8

VINYL PLASTICS
ELASTICITY
RUBBER ELASTICITY OF PRESWOLLEN POLYMER NETWORKS HAVING HIGHLY CROSSLINKED VINYL-DIVINYL SYSTEMS,
AD-600 432 DIV. 14

VISIBILITY
MALAYA
STUDY OF VISIBILITY CONDITIONS IN MALAYA AND VARIOUS ASPECTS OF PHYSICAL GEOGRAPHY AND METEOROLOGY,
AD-600 712 DIV. 2

VISIBILITY
SUBMARINES
SUBMARINE VISIBILITY AND RELATED AMBIENT LIGHT STUDIES,
AD-600 856 DIV. 6

VISUAL PERCEPTION
MATHEMATICAL MODELS
STUDIES OF MATHEMATICAL MODELS OF VISUAL PERFORMANCE CAPABILITY,
AD-600 858 DIV. 28

VISUAL PERCEPTION
PSYCHOMOTOR TESTS
EVALUATION OF PERCEPTUAL FRAMES OF REFERENCE,
AD-600 319 DIV. 28

VITAMIN B COMPLEX
PHOTOCHEMISTRY
SPECTRAL CHANGES DURING PHOTOBLEACHING OF RIBOFLAVIN PHOSPHATE,
AD-600 255 DIV. 4

VOICE COMMUNICATION SYSTEMS
SPECTRA OF VOCODER CHANNEL SIGNALS,
AD-600 185 DIV. 5

VOLTAGE
CODING
METHODS OF CODING IN WHICH THE PRINCIPLES OF TIME CONVERSION AND SEQUENTIAL BINARY WEIGHING ARE COMBINED-CONVERTING VOLTAGES INTO BINARY CODES,
AD-600 587 DIV. 20

VOLTAGE REGULATORS
DESIGN
METHODS OF CONVERTING LOW VOLTAGE D-C POWER TO HIGHER VOLTAGE MORE USEABLE D-C OR A-C POWER FOR OPERATING MILITARY ELECTRONIC EQUIPMENT,
AD-600 843 DIV. 7

VOLUME
BODY FLUIDS
VOLUME CONDITIONED STIMULI AFFECTING SALT AND WATER EXCRETION,
AD-600 342 DIV. 14

WAREHOUSES
CONTROLLED ATMOSPHERES
SURVEY OF LITERATURE ON DEHUMIDIFICATION AND DEHUMIDIFIED STORAGE IN WAREHOUSES,
AD-600 561 DIV. 24
EVALUATION OF U. S. NAVAL DEHUMIDIFIED WAREHOUSE PROGRAM,
AD-600 562 DIV. 24

WARFARE
OPERATIONS RESEARCH
DIFFERENTIAL GAMES: A MATHEMATICAL THEORY WITH APPLICATIONS TO WARFARE AND OTHER TOPICS,
AD-600 022 DIV. 15

WATER WAVES
DEFORMATION
DEFORMATION OF SOLITARY WAVES, PART III SHOALING,
AD-600 042 DIV. 9

WATER WAVES
OCEAN WAVES
WAVE-MAKING RESISTANCE OF CATAMARANS,
AD-600 840 DIV. 31

WATER WAVES
SIMULATION
SIMULATION OF IRREGULAR LONG CRESTED (GAUSSIAN) SEAWAYS,
AD-600 238 DIV. 30

WAVE FUNCTION
QUANTUM MECHANICS
CALCULATIONS OF WAVE FUNCTIONS AND TRANSITION PROBABILITIES,
AD-600 374 DIV. 25

WAVE FUNCTIONS
TABLES
TABLES OF REGULAR AND LOGARITHMIC COULOMB WAVE FUNCTIONS AND TABLES OF GAMMA FUNCTIONS,
AD-600 286 DIV. 25

WAVEGUIDE COUPLERS
S-MATRIX
PROPOSAL FOR 7.75 - 8.35 KMCPS DIPLEXER USING SIDE-WALL COUPLERS AND CUT-OFF GUIDE,
AD-600 332 DIV. 8

WAVEGUIDE COUPLERS
X BAND
SEMICONDUCTOR SWITCHING AND LIMITING USING 3 DB SHORT SLOT (HYBRID) COUPLERS,
AD-600 028 DIV. 8

WAVEGUIDES
PROPERTIES OF A SURFACE WAVE PROPAGATING ALONG A MAGNETIZED FERRITE ROD,
AD-600 465 DIV. 8

WAVEGUIDES
DESIGN
HIGH POWER X-BAND GENERATOR,
AD-600 019 DIV. 8

WAXES
SPECTRA (INFRARED)
INFRARED SPECTRA OF POLYMERS, RESINS, WAXES, PLASTICIZERS, AND ORGANIC SOLVENTS,
AD-600 552 DIV. 14

WEAPON SYSTEMS
EFFECTIVENESS
SOME STATISTICAL METHODS OF ANALYSIS RELATED TO WEAPON EFFECTS,
AD-600 287 DIV. 22

WEAPON SYSTEMS
SYSTEMS ENGINEERING
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM, SOLAR PHOTON ENERGY SOURCES,
AD-600 635 DIV. 12
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM, SOLAR THERMAL ENERGY SOURCES,
AD-600 636 DIV. 12
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM, STAR TRACKER,
AD-600 637 DIV. 12
WEAPON SYSTEM 107A-1, MARK 3 ADVANCED RE-ENTRY VEHICLE PROGRAM SUBSYSTEM DESIGN ANALYSIS,
AD-600 638 DIV. 12
WEAPON SYSTEM 107A-1, MARK-3 ADVANCED RE-ENTRY VEHICLE PROGRAM, INERTIAL WHEEL CONTROL,
AD-600 683 DIV. 12

WEATHER FORECASTING
AVIATION SAFETY
NATIONAL AVIATION METEOROLOGICAL REQUIREMENTS THROUGH 1975,
AD-600 109 DIV. 1

WEATHER FORECASTING
EFFECTIVENESS
WEATHER INFORMATION: ITS USES, ACTUAL AND POTENTIAL,
AD-600 128 DIV. 2

WEATHER FORECASTING
TERMINAL FLIGHT FACILITIES
CONFIGURATION OF WEATHER FACILITIES FOR METROPLEX TERMINAL AREAS,
AD-600 108 DIV. 1

WEATHER STATIONS
OPERATION
OPERATION AND PERFORMANCE OF THE CEDAR HILL, TEXAS METEOROLOGICAL TOWER FACILITY,
AD-600 235 DIV. 2

WEATHERPROOFING
FINISHES + FINISHING
FOREST PRODUCTS LABORATORY NATURAL FINISH FOR WOOD,
AD-600 850 DIV. 14

WELDING
FEASIBILITY STUDIES
FEASIBILITY OF DEVELOPING AN MY-180/210 WELDMENT,
AD-600 792 DIV. 17

WELDING
STEEL
HIGHER-STRENGTH STEEL WELDMENTS FOR SUBMARINE HULLS,
AD-600 794 DIV. 17

WELDING
TIME STUDIES
NOPP STANDARD TIME FORMULA MW-1 FOR MANUAL ARC WELDING OPERATION TIME STUDIES,
AD-600 211 DIV. 24

WESTERN EUROPE
MILITARY STRATEGY
SOME IMPLICATIONS OF STRATEGIC CONCEPTS FOR WESTERN EUROPE NUCLEAR WEAPONS,
AD-600 527 DIV. 18

WHOLE BODY IRRADIATION
BONE MARROW
SUMMARY OF THE EFFECTS OF WHOLE BODY IRRADIATION ON 112 CASES OF CANCER,
AD-600 299 DIV. 14

WIND
ATMOSPHERIC MOTION
SHAPING PATTERNS OF ATMOSPHERIC FALLOUT AT THE EARTH'S SURFACE BY LOCAL CIRCULATIONS,
AD-600 447 DIV. 20

WIND
STRESSES
PRELIMINARY DESIGN STUDY OF A FLAT PLATE REFLECTOR AND SUPPORT UNIT,
AD-600 046 DIV. 8

WIND
TROPOSPHERE
TROSPHERIC WIND PROFILE DESIGN CRITERIA, DATA, AND TECHNIQUES FOR AEROSPACE VEHICLE DESIGN,
AD-600 300 DIV. 2

WIND TUNNELS
MODEL TESTS
WIND TUNNEL INVESTIGATION OF SINGLE AND TANDEM LOW-ASPECT-RATIO WINGS IN GROUND EFFECT,
AD-600 498 DIV. 9

WINDSHIELDS
TRANSPORT PLANES
STRUCTURAL DESIGN INFORMATION ON BIRD-IMPACT RESISTANT WINDSHIELDS FOR HIGH PERFORMANCE, TRANSPORT AIRCRCRAFT, GLASS AND PLASTIC LAMINATED WINDSHIELDS,
AD-600 359 DIV. 1

WINGS
AERODYNAMIC CHARACTERISTICS
WIND TUNNEL INVESTIGATION OF SINGLE AND TANDEM LOW-ASPECT-RATIO WINGS IN GROUND EFFECT,
AD-600 498 DIV. 9

WINGS

NON-MILITARY AND OLDER MILITARY RESEARCH REPORTS

*Descriptors marked with an asterisk are included in the subject index.

ASTRONOMY

NASA-TN-D-2301
Goddard Space Flight Center, National Aeronautics and Space Administration, Greenbelt, Md.
ON THE APPLICATION OF PFAFF'S METHOD IN THE THEORY OF VARIATION OF ASTRONOMICAL CONSTANTS
Peter Musen. Apr 64, 30p
N64-19168
OTS $0.75

DESCRIPTORS: *Astronomical data, Perturbation theory,

N64-18217
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
APPLICATION OF THE METHOD OF AVERAGES TO CELESTIAL MECHANICS
J. Lorell, J. D. Anderson, and H. Lass. 16 Mar 64, 34p
Contract NAS7-100
Technical rept. no. 32-482; NASA CR-53530
OTS $3.60

DESCRIPTORS: *Celestial mechanics, *Nonlinear differential equations.

N64-18434
Boston Univ., Mass.
CALCULATION OF LUNAR SURFACE AREA.
Research rept. no. 14
David Friesen. Feb 64, 14p
Grant NsG-246-62
NASA CR-53588
OTS $1.60

DESCRIPTORS: *Moon, Surface area.

AD-430 646
California Inst. of Tech., Pasadena.
RADIAL VELOCITIES OF DISTANT OB STARS.
Final rept.
Guido Münch. 1 Feb 64, 14p
Grant Nonr-(G)-0005-60
OTS $1.60

DESCRIPTORS: *Stars, Motion, Rotation, Galaxies, Velocity,

The results of radial velocity measurements for 27 faint OB stars at galactic longitudes between $1^{II} = 18^{o}$ and $1^{II} = 66^{o}$ are presented. On the basis of spectroscopic absolute magnitudes in the Yerkes system and (U, B, V) photometry, the rotational velocities of the stars around the galactic center have been derived. In comparison with the rotational curve indicated by the interstellar neutral hydrogen, the stellar motions suggest rotational velocities lower by about 25 km/sec at distances from the center around half that of the sun. The general shape of the rotation curve provided by the new stellar observations remains thus the same as it was found in our previous study. (Author)

PB-165 945
School of Aerospace Medicine, Brooks AFB, Tex.
SOLAR IRRADIANCE FROM MERCURY TO PLUTO
Hubertus Strughold and Oskar L. Ritter. 4 Nov 59, 7p
Rept. no. 60-39; AD-235 228
OTS $1.10

DESCRIPTORS: *Solar radiation, *Pluto, *Mercury (Planet), *Planetary atmospheres, Space environmental conditions, Space flight, Tables,

Statistics are given for the total solar irradiance and illuminance in the space from within the orbit of Mercury to the orbit of Pluto. The radiation intensities within the range of the inner planets and also for the whole solar system are presented graphically.

BEHAVIORAL SCIENCES

PB-166 025
[Aerospace Medical Research Labs. (6570th)]
Wright-Patterson AFB, Ohio.
STUDIES IN CUE UTILIZATION BEHAVIOR. PART I: THE INFLUENCE OF A RELEVANT BUT "UNUSED" CUE IN TRAINING UPON TRANSFER IN A POSITIVE TRANSFER SITUATION
Gordon A. Eckstrand. Apr 52, 24p
Contract AF33(038)15474
WADC Technical rept. 52-79, Part I; ATI-164 224
OTS $2.60

DESCRIPTORS: *Training devices, *Transfer of training, *Training, Learning, Performance (Human), Simulation, Behavior.

In a training device or simulator an attempt is made to provide the primary stimulus cues which exist in the operational equipment or situation for which the student is being trained. In a simulator, however, additional or secondary cues may be introduced unintentionally which the student can use to obtain successful performance. If such secondary cues are available and used by the student, will he also learn to use those which are primary and must be relied upon in the operational situation? In four separate experiments directed toward this question subjects learned, on the basis of a secondary cue, a task which also contained a "primary" cue. They were then forced to perform the task on the basis of the "primary" cue alone. Their performance was compared with that of subjects who had not experienced the "primary" cue during learning. The results of these experiments support the hypothesis that little or nothing is learned about performing a task on the basis of the "primary" cue while learning is occurring on the basis of a secondary cue. The results point-up the potential

Anatomy and Physiology

PB-165 885
Albany Medical Coll., Union Univ., N. Y.
REGULATION OF EXTRACELLULAR POTASSIUM IN HYPOTHERMIA
G. S. Kanter. Jun 63, 14p
Contract AF41(657)393
SAM-TDR-63-14; N63-22664
OTS $1.60

DESCRIPTORS: *Hypothermia, Potassium, Sodium, *Electrolytes (Physiology), Dogs, *Anesthesia, Excretion, Excision, Body temperature, Kidneys, *Blood plasma, Body fluids,

Hypothermia in anesthetized dogs lowered plasma potassium concentration from 3.91 mEq./liter to 3.07 mEq./liter at 29° C., in spite of the fall in arterial pH from 7.35 to 7.24. In normothermia, such a decrease in extracellular pH would cause an increase in plasma K concentration. Possibly, a K+ for Na+ exchange occurred in the renal tubule, with K+ being excreted instead of H+. As we expected that removal of renal function during hypothermia would allow the alteration in pH to cause an increase in extracellular K, dogs were studied after bilateral nephrectomy or bilateral ureteral tie; plasma K still fell markedly. Possibly intracellular pH decreased relatively more than did extracellular pH with a resultant movement of H+ out of the cell and K+ in. With renal function present, the influx of K into the cell in renally deficient dogs is reversed by the renal gradient which causes a decrease in both cellular and extracellular K. (Author)

PB-165 964
Army Medical Research and Nutritional Lab., Denver, Colo.
THE DIRECT MEASUREMENT OF PLASMA TRIGLYCERIDES. Rept. on Metabolism and Nutrition
Edwin L. Bierman. 1 Jul 59, 14p
Rept. no. 236; AD-277 436
OTS $1.60

DESCRIPTORS: *Blood chemistry, *Blood plasma, Blood analysis, *Glycerols, Diagnostic agents, Chromatographic analysis, Cholesterol, Phospholipids

A simple accurate method for the direct determination of triglycerides in plasma was developed and evaluated. Lipids, obtained by ethanol-acetone extraction of plasma, were extracted in petroleum ether and subjected to chromatography on silicic acid columns. By a single elution with ethyl ether, a fraction was obtained which contained simple glycerides free of phospholipids and interfering substances. The esterified glycerol content of the fraction was then determined following alkaline hydrolysis by a modified periodate oxidation procedure. Mean fasting plasma triglyceride levels obtained by this method for normal subjects on controlled dietary intakes of fat are in good agreement with those obtained by other direct methods, and correlate poorly with values obtained when triglycerides are estimated indirectly by difference. (Author)

PB-165 962
Army Medical Research Lab., Fort Knox, Ky.
LETHALITY IN RATS AS A FUNCTION OF FREQUENCY IN CONSTANT- DISPLACEMENT VARIATION. Rept. on Studies of Complex Behavioral Processes
Vernon H. Schaefer, Harry J. Link, Joel U. Farrar, Delbert Wiens, and Donald H. Yost. 20 Jun 59, 18p
Rept. no. 390; AD-218 076
OTS $1.60

DESCRIPTORS: Viability, Rats, Acceleration, *Vibration, Tolerances (Physiology), *Acceleration tolerance, Hemorrhage, Adaptation (Physiology), Heart, Lungs, Aging (Physiology), Sex, Excision, Sex glands, Males, *Psychophysiology,

Lethal exposure time decreased in vibrated rats as a function of increasing frequency and acceleration; variability in lethal time showed a concomitant decrease. Significant pathological effects were myocardial and pulmonary hemorrhage, the latter sometimes accompanied by atelectasis, emphysema, and edema. Some evidence of sex and age differences in resistance to vibration was also obtained. Castration increased survival time in male rats (Author)

PB-165 894
Baylor Univ., Houston, Tex. Coll. of Medicine.
INFLUENCE OF COOLING OF ADJACENT AREAS ON GSR AND BASE RESISTANCE OF AN ISOTHERMAL SITE
Robert Edelberg. 31 May 63, 11p
Contract AF41(609)1527
SAM-TDR-63-70
OTS $1.60

DESCRIPTORS: *Galvanic skin response, *Skin, Resistance (Electrical), Cooling, Temperature,

In a simulation of possible field conditions, skin resistance (R) and galvanic skin response (GSR) were measured from finger sites maintained at constant temperature while adjacent areas were cooled and rewarmed. Cooling of restricted areas up to 10 cm. from the isothermal site produced negligible changes in R and variable effects on GSR amplitude. Cooling the entire hand surface to 15° C. caused an initial increase in GSR amplitude followed by a steady decline to levels as much as 50% below control while R showed only minor changes. GSR count was also altered. Results are interpreted in terms of a two-component system influencing R and GSR. It is concluded that adequate technic demands maintenance of a narrow temperature range over the entire hand or foot. (Author)

N64-18421
Naval School of Aviation Medicine, Pensacola, Fla.
EFFECTS OF EXPOSURE TO CONTINUOUS ROTATION ON NYSTAGMUS PHASE SHIFT. Rept. no. 87
Jorma L. Niven and W. Carroll Hixson. 7 Oct 63, 20p
NASA Order R-47
Proj. MR005.13-6001; NASA CR-53618
OTS $1.60

DESCRIPTORS: *Stress (Physiology), *Nystagmus.

inadequacy of any training device which permits successful performance in the device on the basis of cues other than those which permit successful performance in the operational situation. (Author)

PB-165 905
School of Aerospace Medicine, Brooks AFB, Tex.
THE COMPLEX BEHAVIOR SIMULATOR. A DEVICE FOR STUDYING PSYCHOLOGIC PROBLEMS IN MODERN WEAPONS SYSTEMS
Bryce O. Hartman and Richard E. McKenzie. 14 Jul 60, 21p
Rept. no. 61-9; AD-253 003
OTS $2.60

DESCRIPTORS: Aviation medicine, *Flight simulators, Test methods, Simulation, *Behavior, Psychology, Weapon systems, *Operators (Personnel), Military personnel, *Psychometrics, *Test equipment, Measurement, Stress (Psychology),

Modern weapons systems impose problems of proficiency in which the operator must perform a large array of discrete, discontinuous functions against a continuous background of monitoring and information processing. The new weapons systems require development of special methods of testing and special testing devices. This report describes a device developed to study such problems and presents some of the typical data obtained with it, its possible applications, and some of the technical problems involved in its use. (Author)

BIOLOGICAL SCIENCES

AD-433 237 repriced
Aerospace Medical Research Labs. (6570th), Aerospace Medical Div., Wright-Patterson AFB, Ohio
AN ANNOTATED BIBLIOGRAPHY ON BIOMEDICAL (ANIMAL) SATELLITE VEHICLES, LIFE SUPPORT SYSTEMS AND RELATED TECHNOLOGY
Robert E. Van Patten. Dec 63, 30p
AMRL-TDR-63-126
OTS $0.75

DESCRIPTORS: *Life support, *Satellites (Artificial), *Bibliographies, *Space biology, Space capsules, Oxygen, Carbon dioxide, Space environmental conditions, Food, Wastes (Sanitary engineering), Telemeter systems,

The annotated bibliography includes the major fields of interest to designers of biosatellites and covers the period from 1957 to 1963. Documents are listed under the following categories: (1) Animal Capsules, (2) Oxygen, Carbon Dioxide and Toxic Gases, (3) Thermal and Radiation Environments, (4) Food and Feeding, (5) Waste Handling, (6) Biotelemetry, (7) Power Sources, and (8) Weight and Balance Data. (Author)

NASA-SP-5007
Ames Research Center, National Aeronautics and Space Administration, Moffett Field, Calif.
MEASUREMENT OF THE HEARTBEAT OF BIRD EMBRYOS WITH A MICROMETEORITE TRANSDUCER
Technology Utilization Report
Vernon L. Rogallo. Apr 64, 16p
N64-19015
OTS $0.50

DESCRIPTORS: Birds, *Embryos, *Heart, *Rhythm, *Transducers.

TID-19562
Georgia Univ., Athens. School of Forestry.
THE POPULATION STATUS OF THE LARGER VERTEBRATES ON THE ATOMIC ENERGY COMMISSION SAVANNAH RIVER PLANT SITE. Final rept.
James H. Jenkins and Ernest E. Provost. 15 Feb 64, 49p
Contract AT(38-1)224
OTS $1.25

DESCRIPTORS: *Ecology, *Mammals, Bird, Population, *Vertebrates.

UCRL-11215
Lawrence Radiation Lab., Univ. of California, Berkeley.
BIO-ORGANIC CHEMISTRY QUARTERLY REPORT, SEPTEMBER-NOVEMBER 1963. 20 Jan 64, 29p
Contract W7405-eng-48
OTS $0.75

PB-166 003
School of Aerospace Medicine, Brooks AFB, Tex.
PUBLICATIONS OF THE SCHOOL OF AEROSPACE MEDICINE. Rept. for 1961-1962. Jun 62, 24p
OTS $2.60

DESCRIPTORS: *Military publications, *Space medicine, *Bibliographies, *Space medicine, *Dentistry, *Aviation medicine, Medicine, Reviews, Reports, Medical research

PB-166 002
School of [Aerospace] Medicine, Brooks AFB, Tex.
SUBJECT INDEX OF SCHOOL OF AVIATION MEDICINE PUBLICATIONS. Rept. for Jan 42-May 58. [1958] 92p
OTS $8.60

DESCRIPTORS: *Indexes, *Subject indexing, *Military publications, *Aviation medicine, Accidents, Dentistry, Microbiology, Neurology, Psychiatry, Opthalmology, Otorhinolaryngology, Pathology, Pharmacology, Biochemistry, Physiology, Psychology, Space medicine, Surgery, Anesthesia, Veterinary medicine

PB-166 026
School of [Aerospace] Medicine, Brooks AFB, Tex.
EFFECTS OF EXTREME HEAT ON MAN. I: PROTECTION OF MAN AGAINST CONFLAGARATION HEAT
Konrad Buettner. Feb 50, 23p
Proj. no. 21-02-103, rept. no. 1; ATI 71 463
OTS $2.60

DESCRIPTORS: *Heat, Man, Exposure, *Fires, *Burns, *Fire-protective clothing, Inhibition, Heat transfer, Safety, Pain, Space medicine, Adaptation (Physiology)

The effects of extreme heat on man are studied and physical means of protection by adequate clothing are described. Factors of heat flow toward man, such as conduction and convection of hot air, contact with hot objects, radiation from hot areas and gases, and inhalation of hot air, are analyzed individually with regard to their physiological effects and possible protection from them. Heat injuries to man are caused essentially by overcharging his heat balance, heating his skin to such degrees that it suffers pain and burns, heating his hairs, clothes, etc, above the ignition temperature, and by inhaling hot air. If no special protective equipment is available, protection is afforded by dry or wet clothes, and metal-coated clothing. Protection against the flash-like radiation of an atomic bomb can be afforded by any reflection cover, in particular by very bright textiles and metals. (Author)

PB-165 910
School of Aerospace Medicine, Brooks AFB, Tex.
EFFECT OF MIDDLE EAR MUSCLE ACTION ON CERTAIN PSYCHOPHYSICAL MEASUREMENTS
Scott N. Reger (Iowa State Univ.). 11 Aug 60, 17p
Rept. no. 61-20; AD-253 007
OTS $1.60

DESCRIPTORS: *Ear, *Muscles, *Vestibular apparatus, *Sound transmission, Intensity, Hearing, Psychophysiology,

PB-165 934
School of Aerospace Medicine, Brooks AFB, Tex.
EFFECT OF PURE OXYGEN AT REDUCED PRESSURES ON METABOLIC CHANGES IN MICE LIVING UNDER SIMULATED BIO-SATELLITE CONDITIONS
L. Joe Berry and Dorothy S. Smythe (Bryn Mawr Coll.)
23 Aug 61, 8p
Rept. no. 62-24
OTS $1.10

DESCRIPTORS: Space medicine, Mice, Hypoxia, *Oxygen consumption, Oxygen, Barometric pressure, Simulation, *Metabolism, *Space flight, Excretion, *Urea, Nitrogen, Toxins and antitoxins, Corticosteroid agents,

Metabolic changes were studied in mice which were maintained on air at simulated 14,000 or 20,000 ft. altitude, or on pure oxygen at simulated 30,000 or 34,000 ft. for a period of 3 to 5 weeks. The "equivalence" between protein catabolized and carbohydrate synthesized was determined in mice injected subcutaneously with 5 mg. cortisone acetate and subsequently fasted for 17 hours. For control mice and those exposed to pure oxygen at 30,000 ft. and 34,000 ft. the equivalence was 92, 90, and 98 percent, respectively; animals on air at 14,000 ft. and at 20,000 ft., 46 and 37 percent. In all mice, the protein catabolized in response to cortisone was the same statistically, but the carbohydrate synthesized varied. Survival in mice under hypoxic conditions (14,000 to 20,000 ft.), after endotoxin injection, amounted to 35 to 46 percent; while control animals and animals kept on pure oxygen at 34,000 ft. and given endotoxin showed 84 to 86 percent survival.

PB-165 960
School of [Aerospace] Medicine, Brooks AFB, Tex.
GLOMERULAR FILTRATION AND RENAL PLASMA FLOW DURING HYPERTHERMIA
G. S. Kanter (Albany Medical Coll.). 29 Apr 60, 13p
Rept. no. 60-76; AD-247 164
OTS $1.60

DESCRIPTORS: Kidneys, *Kidney function tests, Body fluids, Urine, *Blood volume, *Fevers, Hematocrit, Blood pressure, Body temperature, Blood volume, Dogs, Dehydration, Stress (Physiology),

The factors that determine the direction and magnitude of the alteration in glomerular filtration rate (GFR) and renal plasma flow (RPF) in hyperthermia were studied. The investigation was conducted on anesthetized dogs, with creatinine clearance being used to measure GFR and para-aminohippuric acid (PAH) to measure RPF. The GRF in 12 mildly dehydrated dogs went from a control value of 68.4 ± 4.5 ml./minute at rectal temperature (RT) of 38.9° C. to a value of 25.1 ± 8.5 ml./minute at rectal temperature of 42.1° C., after 5 hours of exposure to heat. Final dehydration averaged - 2 percent body weight. No decrease in GFR or RPF occurred in either hydrated or dehydrated dogs until severe hyperthermia (> 41.2° C.) was present. Although blood pressures declined in animals of both groups toward the end of each experiment, the decrease in GFR and RPF preceded any marked fall in pressure. Both groups showed an increase in hematocrit value and a decrease in plasma volume which became marked at the end of 5 hours of exposure to heat. The decrease in GFR and RPF appears directly related to the hyperthermia; for upon rapid cooling, GFR and RPF increase toward normal in spite of the persisting decreased blood pressure and plasma volume and increased hematocrit. (Author)

PB-165 911
School of Aerospace Medicine, Brooks AFB, Tex.
HEARING THRESHOLD LEVELS OF NON-JOB-NOISE-EXPOSED AIR FORCE PERSONNEL
Lennart L. Kopra and Lee E. Strickland (Univ. of Texas) 11 Aug 60, 14p
Rept. no. 61-21; AD-254 750
OTS $1.60

DESCRIPTORS: *Hearing, Thresholds (Physiology), *Noise, *Air Force personnel, Aviation medicine, Psychoacoustics,

Pure-tone threshold tests were administered with the Rudmose ARJ-3 automatic audiometer to 446 non-job-noise-exposed Air Force personnel. Results showed that (a) the hearing threshold levels of the non-job-noise-exposed personnel were similar to the thresholds of comparable age groups reported in other studies; (b) the hearing levels of the 18- to 24-year-old group differed appreciably from the hearing levels of age groups

AD-434 083
New Hampshire Univ., Durham
INTUBATION OF THE ABNORMAL [ABDOMINAL] AORTA OF THE ALASKAN GROUND SQUIRREL
J. P. Schmidt and T. G. Metcalf. Oct 63, 5p
Contract AF41(657)350
AAL-TN-63-2
OTS $0.50

DESCRIPTORS: Rodents, Laboratory animals, Surgery, *Cannulation, *Aorta, Polyethylene plastics, Prosthetics, Medical equipment, Medical research, Blood analysis

A technique for intubation of the abdominal aorta of the ground squirrel is described. A polyethylene tube is permanently inserted into the aorta. The tubing is embedded in the skin of the back with two centimeters of the tubing projecting from the surface of the back. The tube can be sealed with heat or tied in a knot. A blood specimen can be withdrawn or an addition made directly into the blood stream by means of the tubing. Experimentations have shown that a splice can be made in the tubing projecting from the back. Additional tubing can be added to the splice, so that any number of additions or withdrawals can be carried out at will.

PB-166 004
School of Aerospace Medicine, Brooks AFB, Tex.
BACKWARD MASKING: MONOTIC AND DICHOTIC CONDITIONS
Lois L. Elliott. 19 Mar 62, 16p
OTS $1.60

DESCRIPTORS: *Auditory perception, *Auditory signals, Noise

"Backward masking" is the term used to denote the situation in which one auditory stimulus is masked by another auditory stimulus which follows it in time, while in "forward masking" the temporal positions of masking and masked signals are reversed. Backward and forward masking were investigated for both monotic and dichotic conditions by using white noise as the masking signal and a 1000-cps probe signal. Results indicate that monotic backward masking occurs over intervals up to 50 msec., while for the dichotic condition, backward masking occurs for intervals as long as 15 msec. Less monotic forward masking is obtained for brief masking intervals, and very little dichotic forward masking is observed. These findings are considered in relation to other experimental results. (Author)

PB-165 939
School of [Aerospace] Medicine, Brooks AFB, Tex.
CORRELATION BETWEEN ALTITUDE AND CONSCIOUSNESS TIME IN HIGH-ALTITUDE NATIVES
Tulio Velasquez (Andean Inst. of Biology). 15 Jul 59, 12p
Rept. no. 60-8; AD-231 546
OTS $1.60

DESCRIPTORS: *High altitude, *Acclimatization, *Blackout (Physiology), Simulation, Stress (Physiology), Psychomotor tests, Tolerances (Physiology), Statistical functions, Time, Aviation medicine,

The consciousness time was determined, after withdrawal of oxygen supply at 32,000, 34,000, 36,000, 38,000, and 40,000 feet of simulated altitude, in high-altitude natives, residents of Morococha, located at 14,900 feet. A correlation curve between level of altitude and consciousness time was derived. The end point corresponded to the time of imminent unconsciousness. The correlation curve between altitude level and consciousness time found in the high-altitude native residents shows that, by comparison with sea-level people, they have a greater tolerance to acute and severe anoxia. The curve appears to be asymptotic. (Author)

PB-165 954
School of Aerospace Medicine, Brooks AFB, Tex.
DAY-TO-DAY STABILITY OF THE AUDITORY THRESHOLD IN NOISE-EXPOSED AND NON-NOISE-EXPOSED AIR FORCE PERSONNEL
Lennart L. Kopra, Duilio T. Pedrini, and Roger W. Fullington (Univ. of Texas) 24 Apr 59, 12p
Rept. no. 59-85; AD-228 804
OTS $1.60

DESCRIPTORS: *Hearing, Thresholds (Physiology), *Tolerances (Physiology), *Noise, Auditory acuity, Audiometry,

Short-term cumulative temporary threshold shift in noise-exposed Air Force personnel was investigated. Daily pure-tone audiometric tests were administered on five consecutive mornings to three groups of men. Twenty-seven flight-line men had noise exposure during the test week; 24 flight-line men had no noise exposure during the test week; 52 men had non-flight-line jobs. Analysis of audiometric data showed that: (a) Most mean thresholds in the three groups on Tuesday through Friday were better than mean thresholds on Monday. Improvement in measured auditory sensitivity during the test week is interpreted as indicative of a learning effect. (b) Intrasubject variability in thresholds at 4000 cps and at 6000 cps was not related to threshold sensitivity. (c) No significant cumulative short-term temporary threshold shift occurred among the noise-exposed men during the five-day test period. (Author)

PB-165 938
School of Aerospace Medicine, Brooks AFB, Tex.
EFFECTS OF ALTITUDE ACCLIMATIZATION ON THE EQUILIBRIUM CONSTANT OF RAT OXYMYOGLOBIN
E. Hardin Strickland, Eugene Ackerman, and Adam Anthony (Pennsylvania State Univ.). 9 Sep 59, 6p
Rept. no. 60-25; AD-233 169
OTS $1.10

DESCRIPTORS: *High altitude, Simulation, *Acclimatization, Body fluids, *Hemoglobin, Muscles, Heart, Oxygen, Oxygen consumption, Altitude chambers, Cells (Biology), Adaptation (Physiology),

Rats which had been continually exposed to simulated altitudes of about 20,000 feet for 2 months were studied for a possible adaptive shift in the oxymyoglobin equilibrium constant, K. The results indicated that cellular acclimatization does not involve changes in the value of K. The significance of this finding as it relates to the functional role of myoglobin during acclimatization is briefly discussed. (Author)

PB-165 931
School of [Aerospace] Medicine, Brooks AFB, Tex.
SERIAL AUDIOGRAMS MEASURED BY BEKSY-TYPE AUDIOMETRY
Max H. O'Connell and Hugh Hamlyn. 1 Jun 59, 8p
Rept. no. 59-97; AD-229 898
OTS $1.10

DESCRIPTORS: *Audiometry, *Hearing, Auditory acuity, Otorhinolaryngology, Thresholds (Physiology),

The variability of serial audiograms of 42 young Lackland airmen were studied. Binaural audiograms were made on nine different days at the test frequencies provided on the Rudmose ARJ-3 Bekesy-type audiometer; 71 percent of the subjects tested showed a range of threshold scores of 20 db or more at least once, and several subjects showed this range of scores more than once at a different or the same frequency. Subjects who showed the greatest variability were not those with the greatest hearing impairment. The variability appeared to be erratic and unpredictable, and probably occurs with most people at one time or another. (Author)

Medical Specialties and Equipment

PB-166 006
School of [Aerospace] Medicine, Brooks AFB, Tex.
THE EFFECTS OF CAVITY DESIGN ON CLINICAL FRACTURE OF THE AMALGAM RESTORATION
Ralph W. Phillips (Indiana Univ.). 9 Aug 60, 13p
Rept. no. 61-18; AD-253 006
OTS $1.60

DESCRIPTORS: *Teeth, Diseases, Dentistry, Fracture (Mechanics), Mercury, Alloys, Decomposition,

Two hundred fifty-seven amalgam restorations were placed in a large cavity preparation, designed to provide extra bulk in the isthmus area. Three different manipulative procedures were employed in order to produce finished restorations of three different mercury contents (49 percent, 58 percent, and 62 percent) and thus restorations with three sets of physical properties. The behavior of these restorations was observed over a 2-year period. Sixty-four additional restorations were inserted in a small cavity preparation utilizing the manipulative procedure which resulted in the highest mercury content (62 percent) and the lowest compressive strength. These restorations were under observation for 1 year. The results indicate there was a definite relationship between mercury content of the restoration and marginal breakdown, since marginal deterioration of the greatest amount and severity was observed among restorations having the highest mercury content. Reduction of the cavity size resulted in a decrease both in the incidence and degree of this type of failure. No correlation could be discerned between either the degree or the rate of tarnish or corrosion and the residual mercury content of the restoration. (Author)

PB-165 923
School of [Aerospace] Medicine, Brooks AFB, Tex.
INTERRELATIONSHIP OF TOOTH COMPOSITION, BODY FLUIDS, DIET, AND CARIES SUSCEPTIBILITY
Albert E. Sobel (Jewish Hospital of Brooklyn) 18 Jan 60, 13p
Rept. no. 60-50; AD-250 041
OTS $1.60

DESCRIPTORS: *Teeth, Dentistry, Diseases, Decomposition, Inhibition, *Diet, Phosphates, Saliva, pH, Bacteria, Mouth, Bolld serum,

Studies of the composition of diet with relation to composition of blood serum and the composition of the inorganic fraction of mineralized tissues led to the formulation of a caries hypothesis: High phosphate diets produce teeth which are less vulnerable to caries because their relatively low carbonate content renders them resistant to acid attack. Experimental work in this and other laboratories has borne out the fact that phosphate has a cariostatic effect. The present interpretation of this experimental evidence suggests that there are two ways in which this effect may occur: (1) increased phosphate in blood serum and saliva may alter the composition of the tooth; or (2) direct action of soluble phosphate in the salive may reduce solubility of tooth mineral, as well as neutralize bacterial acids in the mouth. (Author)

PB-165 900
School of Aerospace Medicine, Brooks AFB, Tex.
A TECHNIC FOR FABRICATING ECG ELECTRODES FOR IN-FLIGHT MONITORING
Sammy E. Howard and Buck R. Wilson. 2 Nov 61, 9p
SAM-TDR-62-49
OTS $1.10

DESCRIPTORS: *Medical equipment, Aviation medicine, *Electrocardiography, Electrodes, Space flight.

Technics for fabricating ECG electrodes for in-flight records are outlined. A vulcanizing technic is used to fabricate the electrode cup. The method described is inexpensive and adaptable to the fabrication of electrodes of many sizes and shapes. (Author)

Microbiology

PB-165 898
Lockheed [Aircraft Corp.] Van Nuys, Calif.
CONTROLLED CONTAMINATION: A PRACTICAL APPROACH FOR DEVELOPING STERILIZATION PROCEDURES FOR SEALED COMPONENTS OF SPACECRAFT
A K. Miller, Joseph T. Cordaro, Henry Buchanan, and Bruce Mann. 28 Jun 63, 10p
SAM-TDR-63-73
OTS $1.10

DESCRIPTORS: *Space medicine, Spacecraft, *Biological contamination, *Electronic equipment, Capacitors, Decontamination, Heat, Temperature, Test methods,

Deliberate contamination of components during manufacture appears both practical and feasible for developing sterilization procedures for spacecraft components. It is possible to determine whether normal manufacturing procedures are sufficient to sterilize or whether the

above 25 years of age; (c) when the thresholds of the left and right ears of the total group were compared, poorer thresholds were noted for the left ears at almost all test frequencies; and (d) previous exposure to gunfire was not significantly related to hearing level. (Author)

PB-165 897
School of [Aerospace] Medicine, Brooks AFB, Tex.
INCIDENCE OF LOSS OF CONSCIOUSNESS IN 1,980 AIR FORCE PERSONNEL
Lawrence E. Lamb, Harry C. Green, Joseph J. Combs, S. A. Cheeseman, and James Hammond. 11 Jul 60, 17p
Rept. no. 61-6
OTS $1.60

DESCRIPTORS: Aviation medicine, *Pilots, Aviation personnel, *Syncope, Etiology, Statistical analysis, *Blackout (Physiology),

The incidence of loss of consciousness among members of the United States Air Force military population was studied. The surveys included 1,578 individuals on flying status and 402 Academy cadets (total, 1,980). Anonymous questionnaires indicate that loss of conscoiusness had occurred in 37.4 percent of rated flying personnel. Loss of consciousness, for reasons other than all types of physical trauma, occurred in 20.2 percent of the flying population. A wide variety of precipitating factors were described by the individuals surveyed. These surveys indicate that loss of consciousness and syncope are not infrequent events in a healthy flying population. The surveys establish that many pilots have had successful flying careers even though they have, on occasion, experienced loss of consciousness precipitated by innumerable causes. (Author)

PB-165 889
School of Aerospace Medicine, Brooks AFB, Tex.
MEASUREMENT OF HUMAN BODY FAT: A QUANTITATIVE METHOD SUITED FOR USE BY AVIATION MEDICAL OFFICERS
Thamas H. Allen. 29 Mar 63, 10p
SAM-TDR-63-45; N63-21201
OTS $1.10

DESCRIPTORS: Measurement, *Lipids, Volume, *Medical equipment, Body weight, *Medical examination, Aviation medicine,

Various volumes of the body are obtained by displacement of water in a specially constructed volumeter. From the total body tissue volume and body weight, one calculates the quantity of body fat. A comparison of two subjects illustrates points of interest in physical examinations. Although a man can be greatly overweight, as judged from height : weight tables, he is not necessarily obese due to fat. Another man can weigh only slightly more than the USAF standard and have an exceedingly large amount of body fat, actually enough to be considered obese. (Author)

PB-165 958
School of Aerospace Medicine, Brooks AFB, Tex.
A PREFERRED METHOD FOR CLINICAL DETERMINATION OF PURE-TONE THRESHOLDS
Raymond Carhart and James F. Jerger (Audiology Lab., Northwestern Univ.) 11 May 59, 15p
Rept. no. 59-91; AD-229 504
OTS $1.60

DESCRIPTORS: Medical equipment, *Audiometry, *Thresholds (Physiology), Measurement, *Auditory acuity, Hearing, Standardization.

The Hughson-Westlake method for obtaining pure-tone thresholds uses a series of tonal ascents. The method encourages stability of reactions by eliciting on-effect responses. It yields a measure of unadapted level of acuity. Moreover, since moment-to-moment fluctuation in acuity is small for most listeners, theory predicts that the Hughson-Westlake method will yield thresholods which are clinically equivalent to those obtained by patterning similar tonal presentations in descending or in "threshold crossing" sequences. Experimental exploration with 36 normal hearing subjects confirms this expectation. The Hughson-Westlake method is recommended for clinical use. (Author)

PB-165 919
School of [Aerospace] Medicine, Brooks AFB, Tex.
RENAL HEMODYNAMICS DURING HYPERTHERMIA CAUSED BY EXPOSURE TO HIGH ENVIRONMENTAL TEMPERATURE
G. S. Kanter (Albany Medical Coll.) Apr 61, 9p
Rept. no. 61-49
OTS $1.10

DESCRIPTORS: *Kidneys, Kidney function tests, *Body temperature, Atmospheric temperature, *Fevers, Urine, Excretion, Hematocrit, *Blood plasma, Blood circulation, Environmental tests.

The alteration in glomerular filtration rate (GFR) and renal plasma flow (RPF) during hyperthermia caused by exposure to high environmental temperature (radiant heating) was studied. Air temperature used was 49° C. All animals were anesthetized with 30 mg. /kg. of sodium pentobarbital. Creatinine clearance was used to measure GFR, and para-aminohippuric acid clearance at low plasma levels was used to measure RPF. With either dehydration or hydration, the GFR and RPF, after an initial increase, fell significantly after 3 to 4 hours' exposure to heat. Rectal temperature averaged 43° C. at the conclusion of the experiment. The hematocrit increased 14 percent. The alteration in renal hemodynamics was shown to be due to an increase in intrarenal resistance. In a separate series devoted to the study of plasma volume, under identical test conditions, there was a mild decrease in plasma volume equal to 14 percent of control and an increase in hematocrit of 15 percent at the end of 2.9 hours of exposure to heat. While increased intrarenal resistance and decreased GFR and RPF are resultants of hyperthermia, the massive loss of plasma volume and increase in hematocrit reported in hyperthermia produced with heating pads (largely conductive heating) need not occur. Such major changes may be ascribed to tissue damage rather than to hyperthermia. (Author)

PB-165 943
School of [Aerospace] Medicine, Brooks AFB, Tex.
RETINAL VASCULAR REACTIVITY IN PATIENTS WITH DIABETES MELLITUS AND WITH ATHEROSCLEROSIS
J. B. Hickam (Indiana Univ.) and H. O. Sieker (Duke Univ.) 20 Oct 59, 5p
Rept. no. 60-37; AD-237 241
OTS $1.10

DESCRIPTORS: *Retina, *Blood circular, Eye, Diseases, *Diabetes, *Atherosclerosis, Blood vessels, Oxygen consumption, Contraction, Opthalmology, Respiration,

In patients with diabetes or atherosclerosis who do not have hypertension, the retinal arteries generally show little or no abnormality on ophthalmoscopic examination. To examine the functional integrity of the retinal vessels in these conditions, a comparative study was made of the constrictor response of retinal arteries and veins to the inhalation of oxygen in a considerable number of control subjects and patients with diabetes or with uncomplicated atherosclerosis. In uncomplicated diabetes, the retinal arteries showed a significant loss of the ability to constrict on breathing oxygen, and the loss was intensified when retinopathy was present. It is suggested that this impairment of retinal vascular reactivity in diabetes may contribute to the progression of retinopathy. In uncomplicated atherosclerosis, there is no significant loss of retinal vascular reactivity. (Author)

AD-430 123
School of Aerospace Medicine, Brooks AFB, Tex.
STUDIES IN DECOMPRESSION SICKNESS. CARDIO-RESPIRATORY RESPONSES OF ANESTHETIZED DOGS TO COMPRESSION THERAPY FOLLOWING EXPERIMENTAL DECOMPRESSION SICKNESS
Robert G. McIver and Sidney D. Leverett, Jr.
15 Aug 63, 13p
SAM-TDR-63-94; N64-15744
OTS $1.60

DESCRIPTORS: *Decompression sickness, Dogs, *Respiratory system, Anesthesia, *Cardiovascular system,

Decompression sickness was studied by use of a special technic for the production and recognition of the disorder in laboratory animals. Objective evidence is presented for substantiating the use of compression therapy in the treatment of both caisson and altitude types of decompression sickness. There is suggestive evidence that even very small overpressures may be of benefit in treating or transporting some cases of severe altitude decompression sickness. The importance of rapid recognition and treatment is emphasized, as well as careful scrutiny of all patients who appear to be 'hyperventilating' after decompression especially those patients with other signs or symptoms of decompression sickness. (Author)

PB-165 882
School of Aerospace Medicine, Brooks AFB, Tex.
CURRENT CONCEPTS OF ACUTE CARBON TETRACHLORIDE HEPATOTOXICITY
Philip W. Andrews. Feb 63, 29p
Review 2-63
OTS $2.60

DESCRIPTORS: *Liver, Hypoxia, Toxicity, *Carbon tetrachloride, Necrosis, Fats, Nervous system, Cells (Biology),

A literature survey of hydrocarbon-induced, experimental, acute hepatotoxicity was made. It was concluded that CCl_4, and probably other hydrocarbons, directly interfere with the selective permeability of the liver cell wall and membranous endoplasmic reticulum for electrolytes, water, and certain hydrophilic proteins. Concomitantly the toxin stimulates the sympathetic nervous system and the release of its hormones. These reduce hepatic blood flow, by vasoconstriction. thereby inducing cetrilobular hypoxia, degeneration, and necrosis. These also cause massive mobilization of fats from the peripheral depots. These fats accumulate in the liver where their secretion, as triglycerides, is blocked by unknown mechanisms. (181 references) (Author)

PB-165 920
School of Aerospace Medicine, Brooks AFB, Tex.
THE DISTRIBUTION AND METABOLISM OF 2-MERCAPTOETHYLGUANIDINE AND BIS(2-GUANIDOETHYL) DISULFIDE IN MICE
Bernard Shapiro and Emanuel E. Schwartz (Albert Einstein Medical Center) 17 Nov 60, 10p
Rept. no. 61-52; AD-254 753
OTS $1.10

DESCRIPTORS: *Radioprotective agents, *Guanidines, Organic sulfur compounds, Sulfides, Mice, *Metabolism, Distribution, Tissues (Biology),

Various doses of MEG-S^{35} and GED-S^{35} were administered by oral and intraperitoneal routes to 8- to 10-week old C57BL/6J mice. The distribution of S^{35} in the tissues of the animals was determined at various times. The metabolic forms of S^{35} in the tissues of the animals were isolated and partially identified. It was found that S^{35} concentrations were lowest in bone marrow and brain and highest in liver and kidney. Increasing doses of MEG-S^{35} and GED-S^{35} generally resulted in increasing tissue S^{35} concentrations. After oral administration of the protective agent, as much as one-third of the administered dose was found in the gastrointestinal tract. This explained the need to use much larger doses for protection by oral administration of MEG or GED. More than half of the S^{35} in the animal was in the protein-bound form. No other form was seen consistently in all tissues studied. It was suggested that the protein-bound form may be the protective form of MEG and GED. (Author)

sterilization procedures required (e.g., temperature-time intervals for dry heat) to sterilize can be accomplished without component damage. Methods are presented for controlled contamination with bacterial spores highly resistant to dry heat and bacteriologic recovery of such spores. Impregnated (e.g., with polybutylene) capacitors were rendered sterile during manufacture; nonimpregnated capacitors were not. Any damaging effects of heat sterilization might be increased, if the components were subjected to further heating when installed in circuits of spacecraft instrumentations. (Author)

PB-165 953
School of [Aerospace] Medicine, Brooks AFB, Tex.
AN EVALUATION OF SEVERAL MEDIA FOR THE EARLY DETECTION OF PSEUDOMONAS AERUGINOSA ENCOUNTERED IN CLINICAL PRACTICE
Irving Davis, Walter Sellers, Hyman Orbach, and George Weddington. 22 Apr 59, 6p
Rept. no. 59-82; AD-226 824
OTS $1.10

DESCRIPTORS: *Culture media, Detection, Diseases, *Pseudomonas, Diagnosis, Identification, Infectious diseases, Organic pigments,

Pigmentation was the criterion used in evaluating media for the early detection of Pseudomonas aeruginosa encountered in clinical specimens. Few of the laboratory media reported to identify the Pseudomonas by pigmentation have been successful. Pigmentation was found to be greater, both qualitatively and quantitatively, when Sabouraud maltose agar was used to isolate the organism. This medium might well be incorporated for routine use in diagnostic bacteriologic procedures in certain clinical specialties. (Author)

Pathology

PB-165 904
School of Aerospace Medicine, Brooks AFB, Tex.
BIOCHEMISTRY AND CYTOLOGY OF EFFUSIONS IN AEROTITIS MEDIA. A COMPARISON WITH FINDINGS FOR FLUIDS OF NONBAROTRAUMATIC ORIGINS
Ben H. Senturia, Carl F. Gessert, Charles D. Carr, and Elizabeth S. Baumann (Washington Univ.) 8 Jul 60, 12p
Rept. no. 61-4; AD-250 984
OTS $1.60

DESCRIPTORS: Aviation medicine, Biochemistry, Cytology, Ear, Diseases, Body fluids, *Semicircular canals, *Vestibular apparatus, Secretion, Blood serum, *Wounds and injuries, Barometeric pressure.

Aerotisis media specimens were examined for cytologic and certain biochemical constituents. The findings were compared with various categories of middle ear effusions of nonbarotraumatic origin and with blood serum, The chemical, physical, and microscopic properties of aerotitis media effusions most closely resemble the serous category of middle ear effusions. Aerotitis media effusions probably have their origin in blood serum. The negative pressure which occurs in the middle ear upon descent from altitude causes vascular changes sufficient to allow various blood components to enter the tympanic cavity. No evidence of inflammation was found. (Author)

PB-166 001
School of [Aerospace] Medicine, Brooks AFB, Tex.
AN OUTBREAK OF INFECTIOUS HEPATITIS AMONG CHIMPANZEE HANDLERS AT A UNITED STATES AIR FORCE BASE
William D. Hillis. 9 Jan 61, 14p
Rept. 61-64; AD-253 008
OTS $1.60

DESCRIPTORS: *Infectious hepatitis, Epidemiology, Biological laboratories, Technicians, Hepatitis viruses, Scientific personnel, *Chimpanzees, *Disease vectors,

An outbreak of infectious hepatitis among personnel of a chimpanzee vivarium at a United States Air Force installation is described. Eleven cases, two of which were subclinical, were reported from August 1958 through December 1960. All of these individuals experienced repeated close contacts with newly acquired young chimpanzees. Only 21 personnel had such contacts during the specified period, yielding an attack rate of more than 50 percent. Incidence of the disease among base personnel and their dependents having no contact with the chimpanzees did not exceed 3.7 per 1,000. A control group of 88 base personnel having no history of contact with chimpanzees showed no subclinical hepatitis as indicated by normal serum transaminase (glutamic-oxaloacetic) determinations. Among 75 individuals who experienced repeated contacts with older chimpanzees no cases of hepatitis were known to develop, and serum transaminases in this group were all normal. The possibility that the young chimpanzees serve as transient carriers of human hepatitis virus is suggested and discussed.

PB-165 890
School of Aerospace Medicine, Brooks AFB, Tex.
THE PHOTOSTRESS TEST FOR THE EVALUATION OF MACULAR FUNCTION
Sanford L. Severin, Johy Y. Harper, Jr., and James F. Culver. 1 Apr 63, 12p
SAM-TDR-63-47; N63-23372
OTS $1.60

DESCRIPTORS: Space medicine, Photosensitivity, Eye, *Retina, Diseases, *Stress (Physiology), *Flash-blindness, Diagnostic agents, Vision, Adaptation (Physiology), Ophthalmology,

A technic is presented for evaluation of macular performance that is based on precisely measuring the time required for a patient to recover sufficient visual function to perform defined visual tasks after he has been dazzled with an intense flash of light. The process of delivering photic energy to the retina has been termed photostress and the term photofatigue has been proposed to graphically describe the condition of the retina after photostress. Cases studied are presented that will aid in the evaluation of this test in the study of macular disease, and a possible mechanism is discussed. (Author)

BNL-828(T-323)
Brookhaven National Lab., Upton, N. Y.
TRACE METALS: ESSENTIAL OR DETRIMENTAL TO LIFE.
Brookhaven Lecture Series no. 26.
George C. Cotzias. 10 Apr 63, 18p
OTS $0.50

UCRL-11184
Lawrence Radiation Lab., Univ. of California, Berkeley.
BIOLOGY AND MEDICINE FALL 1963. Semiannual rept.
John H. Lawrence and Tove Neville, ed. [1964] 161p
Contract W7405-eng-48
OTS $2.75

NYO-2181-1
New Jersey State Dept. of Health, West Orange.
CURRENT DATA FROM THE EPIDEMIOLOGICAL FOLLOW-UP OF THE NEW JERSEY RADIUM CASES
Lester A. Barrer and Elizabeth Z. Stewart. 1 Oct 63, 260p
Contract AT(30-1)2181
OTS $3.50

NYO-10604
New Jersey State Dept. of Health, West Orange.
EPIDEMIOLOGICAL FOLLOW-UP OF THE NEW JERSEY RADIUM CASES: I. REPORT OF THE MEDICAL STUDY GROUP (JULY 1963). II. RESUMES OF FINDINGS FROM INDIVIDUAL CASE STUDIES.
Progress rept. to Jul 63. 15 Apr 64, 153p
Contract AT(30-1)2181
OTS $2.75

ORINS-43
Oak Ridge Inst. of Nuclear Studies, Tenn.
MEDICAL DIVISION RESEARCH REPORT FOR 1963.
May 64, 109p
Contract AT(40-1)GEN-33
OTS $2.25

DESCRIPTORS: *Radiotherapy, *Leukemia, Mice, Bone marrow, Tissue culture, *Cancer.

UR-641
Rochester Univ., N. Y. School of Medicine and Dentistry.
BACKGROUND GAMMA SPECTRA IN A SALT MINE
Albert Rieder and Charles Scholes. 9 Mar 64, 22p
Contract W7401-eng-49
OTS $0.75

PB-166 005
School of [Aerospace] Medicine, Brooks AFB, Tex.
DEVELOPMENT, DOSIMETRY, AND USE OF MICRO-BEAMS OF X-RAYS FOR SIMULATING MICRO-LESIONS PRODUCED IN ANIMAL TISSUES BY HEAVY COSMIC RAY PRIMARIES
William E. Stratle and Herman B. Chase (Brown Univ.). 25 Apr 60, 11p
Rept. no. 60-70; AD-250 981
OTS $1.60

DESCRIPTORS: Space medicine, *Dosimeters, *X-rays, Animals, Tissues (Biology), Simulation, Radiation effects, *Cosmic rays, Radiation injuries, Radiological dosage,

PB-165 955
School of Aerospace Medicine, Brooks AFB, Tex.
ELECTROPHORESIS OF PROTEINS OF IRRADIATED MOUSE CHIMERAS
Raymond A. Popp and L. H. Smith (Oak Ridge National Lab.) 6 May 59, 11p
Rept. no. 59-87; AD-228 806
OTS $1.60

DESCRIPTORS: *Proteins, *Electrophoresis, Mice, *Genetics, Hemopoietic system, Tissues (Biology), Bone marrow, Transplantation, Radiation effects,

A comparative study was made of the proteins in various tissues of Sprague-Dawley rats and $(101 \times C3H)F_1$ mice. The results were used as a basis for studying changes in the protein patterns in tissues of rat-mouse chimeras - that is, $(101 \times C3H)F_1$ mice given 950 r of x-rays and then injected with bone marrow of Sprague-Dawley rats. Electrophoretic mobilities of rat proteins extracted from bone marrow, spleen, lymph node, and thymus of chimeras and from rats were similar. The quantity of rat proteins and the rate and time at which they appeared in different hematopoietic organs were quite different. Some mouse-type proteins not found in chimera tissues examined 30 days after treatment were frequently present on the fiftieth day or later, suggesting regression of the graft. The results are consistent with the idea that rat-type proteins synthesized in the cytoplasm of transplanted rat cells are controlled by the genotype of these cells, even in a mouse environment. They also indicate that there are organ-specific differences in the rate and degree of replacement of transplanted cells that require further investigation. (Author)

PB-165 896
School of Aerospace Medicine, Brooks AFB, Tex.
LATE SOMATIC EFFECTS OF INTERNALLY DEPOSITED RADIOISOTOPES
T. T. Odell, Jr. and A. C. Upton (Oak Ridge National Lab.) 15 Jul 59, 19p
Rept. no. 60-12
OTS $1.60

DESCRIPTORS: *Radioactive isotopes, *Radiation effects, *Radiation hazards, Half life, Radioactive fallout, Nuclear explosions, Skeleton,

The late pathologic effects of internally deposited radioisotopes are similar to those of external radiations and include the induction of degenerative changes, neoplasms, and shortening of the life span. The probability of the induction of these effects varies with the amount of radiation absorbed, the dose rate, the quality of the radiation (LET), the distribution of the absorbed dose in tissue, and the genetic and physiologic constitution of the organism irradiated. Consequently, the effects of radioisotopes vary greatly, depending on such factors as the physical half-life and chemical nature of the isotope and of its decay products; the chemical and physical properties of the form in which the isotope is encountered; the route of entry of the isotope into the body; and the uptake, distribution, metabolism, and rate of elimination of the isotope from

PB-165 949
School of Aerospace Medicine, Brooks AFB, Tex.
THE EFFECT OF DRUGS ON THE ENERGY METABOLISM OF CEREBRAL TISSUE
Norman Weiner (Harvard Medical School) Aug 59, 7p
Rept. no. 59-48; AD-228 803
OTS $1.10

DESCRIPTORS: *Oxygen consumption, *Metabolism, Cerebrum, Tissues (Biology), *CNS depressants, *CNS stimulants, *Barbiturates, *Chlorpromazine, *Reserpine, Nicotinic acid, Hydrozine derivatives, Potassium compounds, Chlorides, Fatty acids, Amines, *Amino acids, *Aspartic acid, *Acetates, *Glutamic acid, *Glutamine, *Glucose, *Succinates, *Oxalacetic acid, *Lactic acid, *Pyruvic acid, Ketones, Propionic acid, Dibasic acids.

The effects of various substrates and drugs on the oxidative metabolism of rat cerebral tissue slices were studied. Glucose, lactate, and pyruvate appeared to be the best substrates in the system used. Alanine, aspartate, acetate, and gamma-aminobutyrate did not alter O_2 consumption from that rate which occurs in the absence of any exogenous substrate. Intermediate rates of oxygen consumption were obtained with alpha-ketoglutarate, glutamate, glutamine, succinate, and oxaloacetate as substrates. KCl stimulate cerebral oxidative metabolism. Pentobarbital and chlorpromazine depressed O_2 consumption. Epinephrine, 5-hydroxytryptamine, d-amphetamine, iproniazid, reserpine, and mephentermine did not appear to influence cerebral O_2 consumption over a wide range of concentrations. (Author)

PB-165 903
School of Aerospace Medicine, Brooks AFB, Tex.
MECHANISM OF ACTION OF AET. THE RADIATION CHEMISTRY OF 2-MERCAPTOETHYLGUANIDINE AND BIS(2-GUANIDOETHYL) DISULFIDE IN AQUEOUS BUFFERED SOLUTIONS
Bernard Shapiro and E. Anne Dickens (Albert Einstein Medical Center) 6 Jul 60, 12p Rept. no. 61-2; AD-254 749
OTS $1.60

DESCRIPTORS: *Radioprotective agents, Organic sulfur compounds, *Guanidines, *Ureides, Sulfides, Bromides, Radiation chemistry, Solutions.

Aqueous buffered solutions of MEG and GED were irradiated with a 3-curie Co^{60} gamma-ray source. The radiation products were separated and identified by paper chromatography and electrophoresis. Irradiation of solutions of MEG produced GED. Irradiation of solutions of GED produced 2-guanidoethane-sulfinic acid, taurocyamine, inorganic sulfate, and guanidine. G values were calculated for the oxidation of MEG at pH 6 (14.3 to 18.2), and for the oxidation of GED at pH 7.5 (0.29) and pH 8.5 (1.0). G values were also calculated for the formation of 2-guanidoethanesulfinic acid plus taurocyamine at pH 7.5 (0.42), and for the formation of inorganic sulfate and guanidine at pH 7.5 (0.17). The oxidation of MEG and GED by ionizing radiation indicated that these protective agents were capable of reacting with oxidizing free radicals formed in irradiated aqueous solutions. (Author)

PB-165 941
School of Aerospace Medicine, Brooks AFB, Tex.
PAROTID FLUID, SERUM, AND URINE 17-HYDROXY-CORTICOSTEROIDS FOLLOWING A TWO-HOUR INTRAVENOUS INFUSION OF ADRENOCORTICOTROPIN
Ira L. Shannon, John R. Prigmore, Robert A. Brooks, and Ralph P. Feller. 20 Aug 59; 5p
Rept. no. 60-21; AD-231 619
OTS $1.10

DESCRIPTORS: *Corticosteroid agents, Alcohols, *Adrenocorticotropic hormone, *Saliva, *Blood serum, *Urine, Parenteral infusions,

The intravenous administration of 40 international units of ACTH over a 2-hour period produced alterations in parotid fluid 17-OHCS concentration directly comparable to those evidenced in serum and in urine. These findings further solidify the concept that parotid fluid free 17-OHCS levels may well be utilized in evaluating adrenocortical status in humans. (Author)

PB-165 950
School of Aerospace Medicine, Brooks AFB, Tex.
SERUM ENZYME CHANGES AFTER ADMINISTRATION OF NEPHROTOXIC DRUGS
Richard A. Seibert (Baylor Univ.) Sep 59, 7p
Rept. no. 59-59; AD-228 805
OTS $1.10

DESCRIPTORS: *Enzymes, Blood serum, Lactates, *Oxidoreductases, *Aldehyde-lyases, Kidneys, Mercury compounds, Chlorides, Sodium compounds, Sulfates, *Carbon tetrachloride, *Polymyxins,

Serum enzymes (lactic dehydrogenase, aldolase, and enolase) were measured after administration of the nephrotoxic compounds mercuric chloride, sodium tetrathionate, polymyxin B, and carbon tetrachloride. Renal function studies (RPF and GFR) were run before and after the compounds were given to check for kidney damage; this was found after sodium tetrathionate and carbon tetrachloride. Serum enzyme activity reached a maximum characteristic of each compound and its route of administration at the following times post-injection: mercuric chloride, intravenously, 1 to 2 hours; sodium tetrathionate, intravenously, 12 to 24 hours; carbon tetrachloride, orally, 24 hours; polymyxin B, intramuscularly, 12 to 24 hours. All of these compounds raised LDH and aldolase activities, but there was no change in enolase activity. Electrophoretic separation of serum increased aldolase activity tenfold and LDH activity fivefold, peak activity being observed in the gamma-globulin area following damage by carbon tetrachloride or sodium tetrathionate. After mercuric chloride a double peak occurred—one in the gamma-globulin area and another higher peak in the alpha^2-globulin area. (Author)

Radiobiology

TID-3098(Bks 1, 2 & Index)
Atomic Energy Commission, Oak Ridge, Tenn.
Div. of Technical Information Extension.
THE EFFECTS OF RADIATION AND RADIOISOTOPES ON THE LIFE PROCESSES. An annotated bibliography.
Charlie M. Pierce, comp. Sep 63, 1842p
OTS $15.00

Clinical criteria, consisting of an appraisal of surgical difficulty and postoperative pain, and chemical criteria, consisting of changes in serum free and urine total 17-OHCS, were studied on 71 patients who had undergone the removal of mandibular third molar impactions. A significant association was found between surgical difficulty and serum free 17-OHCS concentration in blood specimens taken at both 1 hour ($P < .01$) and 3 hours ($P < .05$) postoperatively. No significant association was found between pain experience at 3 hours postoperatively and serum free 17-OHCS concentration when the blood samples were drawn at 1 hour postoperatively. A significant correlation was found between pain experience at 3 hours postoperatively and serum free 17-OHCS concentration when the blood samples were drawn at 3 hours postoperatively ($P < .01$). No significant differences in urine total 17-OHCS concentration were detected when the subjects were grouped according to either surgical difficulty or postoperative pain experience. (Author)

CHEMISTRY

IS-667
Ames Lab., Iowa State Univ. of Science and Tech.
ELECTROCHEMICAL PROCESSES IN FUSED SALTS
Lowell Alvin King and F. R. Duke. July 63, 102p
Contract W7405-eng-82
OTS $2.25

DESCRIPTORS: *Fused materials, *Salts, Electrochemistry

IS-780
Ames Lab., Iowa State Univ. of Science and Tech.
SOLVENT EXTRACTION STUDY OF THE SYSTEM MONAZITE RARE EARTH NITRATES-NITRIC ACID-WATER-TRIBUTYL PHOSPHATE
Brooks Martin Sharp and Morton Smutz. Nov 63, 156p
Contract W7405-eng-82
OTS $2.75

ANL-6817
Argonne National Lab., Ill.
LABORATORY INVESTIGATIONS IN SUPPORT OF FLUID BED FLUORIDE VOLATILITY PROCESSES. PART VI: A. THE ABSORPTION SPECTRUM OF PLUTONIUM HEXAFLUORIDE, B. ANALYSIS OF MIXTURES OF PLUTONIUM HEXAFLUORIDE AND URANIUM HEXAFLUORIDE BY ABSORPTION SPECTROMETRY
Martin J. Steindler and William H. Gunther. Jan 64, 16p
Contract W31-109-eng-38
OTS $0.50

IDO-11006
Monsanto Research Corp., Dayton, Ohio.
BIPHENYL LIQUID HEAT TRANSFER AND VAPOR DEPOSITION STUDIES AT 700° AND 800°F. Final rept. 9 Feb 61-31 May 63.
C. D. King, Jr. and W. J. Moodie. 1 Aug 63, 97p
Contract AT(10-1)1088
OTS $2.25

DESCRIPTORS: Boiling, Steel, Corrosion, *Reactor coolants.

ORNL-3516
Oak Ridge National Lab., Tenn.
AMINES AS EXTRACTANTS, SURVEY OF THE DESCRIPTIVE AND FUNDAMENTAL EXTRACTION CHEMISTRY
C. F. Coleman. [Oct 62] 37p
Contract W7405-eng-26
OTS $1.00

DESCRIPTORS: *Amines, *Bibliographies, Solvent extraction

ORNL-3598
Oak Ridge National Lab., Tenn.
COMPATIBILITY OF UNSUPPORTED PYROLYTIC-CARBON COATED URANIUM DICARBIDE PARTICLES WITH WATER VAPOR
J. P. Blakely, N. V. Smith, and L. G. Overholser. Apr 64, 29p
Contract W7405-eng-26
OTS $0.75

ORNL-3528
Oak Ridge National Lab., Tenn.
ISOTOPIC MASS SPECTROMETRY OF THE ELEMENTS
E. J. Spitzer and J. R. Sites, comp. [1963] 81p
Contract W7405-eng-26
OTS $2.00

DESCRIPTORS: *Mass spectroscopy, Isotopes, *Chemical elements.

ORNL-3524
Oak Ridge National Lab., Tenn.
PROPERTIES AND CLEANUP OF DEGRADED TRIBUTYL PHOSPHATE-AMSCO SOLUTIONS AND THE RELATIVE STABILITIES OF ALTERNATIVE EXTRACTANT-DILUENT SYSTEMS
C. A. Blake, Jr., W. Davis, Jr., and J. M. Schmitt
Contract W7405-eng-26
OTS $1.00

DP-871
Savannah River Lab., Aiken, S. C.
STABILITY OF FERROUS SULFAMATE IN NITRIC ACID SOLUTIONS
E. Kenneth Dukes and Richard M. Wallace. Feb 64, 7p
Contract AT(07-2)1
OTS $0.50

KY-452
Union Carbide Nuclear Co., Paducah, Ky.
INVESTIGATIONS OF CARBON TO CARBON CONNECTED ANODE ASSEMBLIES IN FLUORINE GENERATORS
W. B. Goode, Jr., C. R. King, W. K. Henderson, and S. Bernstein. 10 Apr 64, 42p
Contract W7405-eng-26
OTS $1.00

KY-453
Union Carbide Nuclear Co., Paducah, Ky.
PLASMA TORCH PRODUCTION OF ELEMENTAL BORON
G. E. Biggerstaff, W. R. Golliher, R. L. Harris, and W. R. Rossmassler. 26 Feb 64, 43p
Contract W7405-eng-26
OTS $1.00

the body. Because of the great diversity among radioisotopes in these properties, a wide variety of effects was observed. In general, the most hazardous isotopes appear to be those with long half-lives, energetic emissions, and a predilection to become localized in the skeleton. (115 references) (Author)

PB-165 944
School of [Aerospace] Medicine, Brooks AFB, Tex.
LEVER-PRESSING BEHAVIOR OF ALBINO RATS DURING PROLONGED EXPOSURES OT X-RADIATION
W. Lynn Brown, John E. Overall, James E. Wicker (Univ. of Texas) and Loren C. Logie. 15 Oct 59, 12p
Rept. no. 60-36; AD-235 227
OTS $1.60

DESCRIPTORS: *Behavior, Rats, Psychomotor tests, X-rays, *Radiation effects, Adaptation (Physiology), *Dose rate, Whole body irradiation, Neuromuscular transmission,

Thirty-six male albino rats were first trained to respond to a 20-to-1 reinforcement ratio in a Skinner box. Following the attainment of a high response rate, the rats were randomly divided into 6 groups corresponding to 6 treatment conditions. Subsequently, the animals in the 6 groups were exposed to 0 r/hr, 25 r/hr, 50 r/hr, 75 r/hr, 100 r/hr, or 125 r/hr during a 1-hr period in the Skinner-box apparatus each day. Changes in response rate as a function of dose rate, number of exposures, and the interaction between these variables were recorded. The largest source of variance in response rate was found to be the cumulative total dose received by the organism. A simple linear function relating the square root of response rate to the cumulative total dose was found to account for over 86% of the variance in average daily performance for the 6 groups. (Author)

PB-165 951
School of Aerospace Medicine, Brooks AFB, Tex.
SERUM ENZYME ACTIVITY IN THE RABBIT FOLLOWING WHOLE-BODY IRRADIATION
Harry G. Albaum (Brooklyn Coll.). 12 Feb 59, 9p
Rept. no. 59-71; AD-230 634
OTS $1.10

DESCRIPTORS: Blood serum, *Enzymes, *Radiation effects, Rabbits, *Transferases, Glutamic acid, Oxalacetic acid.

Data are presented on alterations in serum enzyme activity following whole-body irradiation of rabbits at a dosage level of 750 r. Of the 14 enzymes investigated, no single enzyme was shown to be a better early indicator of radiation trauma than glutamic oxalacetic transaminase. Evidence is presented that at least 3 of the enzymes are significantly lower in the serum of irradiated animals 6 hours after radiation than they are in the sham controls, suggesting either inactivation or interference with synthesis. Of the 14 enzymes studied, 4 were significantly elevated, 3 were lowered, and 7 remained unchanged within an interval of 24 hours after exposure. (Author)

PB-165 942
School of Aerospace Medicine, Brooks AFB, Tex.
SOLUBILITY OF HEMOGLOBIN AS A RED CELL MARKER IN IRRADIATED MOUSE CHIMERAS
Raymond A. Popp and C. E. Cosgrove (Oak Ridge National Lab.) 7 Oct 59, 9p
Rept. no. 60-33; AD-237 240
OTS $1.10

DESCRIPTORS: *Hemoglobin, *Erythrocytes, *Genetics, Mice, Solubility, Tissues (Biology), Crystallization, Radiation effects,

The report describes differences in the solubility of various mouse hemoglobins that can be used to identify erythrocytes of genetically different types probably not distinguishable from one another serologically or electrophoretically. (Author)

Surgery

PB-165 899
School of Aerospace Medicine, Brooks AFB, Tex.
HEMATOLOGIC CHANGES FOLLOWING SIMPLE EXODONTIA
Ira L. Shannon, Edward E. Davis, and William A. Gibson. 18 Jul 63, 11p
SAM-TDR-63-82
OTS $1.60

DESCRIPTORS: *Dentistry, *Teeth, Blood cells, Hematology, Blood cells, *Blood analysis, Leucocytes, Lymphocytes, Excision, Erythrocytes, Hematocrit, Adaptation (Physiology),

Hematologic studies were carried out on 90 systemically healthy, young adult males, some of whom underwent a simple exodontic experience. In one experiment, blood samples were collected before and at 2- and 4-day intervals after tooth removal. In another, blood was drawn prior to and at 4 hours after exodontia. In the 4-hour study, significant changes following extraction were noted for white blood cells, neutrophils, lymphocytes, hematocrit, and corrected sedimentation rate. Only the latter factor was found to change significantly in the 4-day study. These results are held to be related to the previously established adrenocortical hyperactivity in patients undergoing comparable dental procedures. (Author)

PB-165 884
School of Aerospace Medicine, Brooks AFB, Tex.
SUBJECTIVE AND OBJECTIVE MEASUREMENT OF RESPONSES TO THIRD MOLAR IMPACTION SURGERY
Lucian Szmyd, Ira L. Shannon, Warren R. Hester, and Arthur J. Stumpf, Jr. Jul 63, 7p
SAM-TDR-63-2
OTS $1.10

DESCRIPTORS: *Dentistry, *Teeth, Excision, Blood serum, Urine, Pain, Surgery, *Corticosteroid agents, Alcohols,

PB-165 967
Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
GEOMAGNETIC GIANT PULSATIONS IN THE ANTARCTIC.
Scientific rept. no. 12, on Antarctic Research and Data Analysis
Teruo Sato. 19 Mar 64, 48p
Contract NSF-C255
RAD-TR-64-8
OTS $4.60

DESCRIPTORS: *Geophysics, *Terrestrial magnetism, Oscillation, Ionosphere, Magnetic storms, Aurorae, *Antarctic regions

Geomagnetic oscillations in high southern latitudes with periods of one to several minutes are studied, and their cause is considered. Most giant pulsations in high latitudes are a local phenomenon taking place in a specified portion of the auroral zone and polar latitudes. The local time of maximum occurrence frequency is different at each area. Phases of pulsations are not coincident between stations. When giant pulsations arise simultaneously over the globe (usually after a sudden commencement geomagnetic storm), variations in high latitudes are of a different nature from those in middle and low latitudes. Most giant pulsations in high latitudes seem to be caused by the electric current which is related to the incidence of charged particles in the ionosphere. Giant pulsations generated by hydromagnetic waves, such as are seen in middle and low latitudes (with fundamentally the same phase over the world), are usually masked in high latitudes by large amplitude pulsations of an ionospheric origin. (Author)

Climatology and Meteorology

STR-10-1(Excepts)
Atomic Energy Commission, Washington, D. C.
HANDBOOK ON AEROSOLS. 1950, reissued 1963, 151p
OTS $2.75

PB-165 965
Schellenger Research Labs., Texas Western Coll., El Paso.
ESTABLISHMENT OF A METEOROLOGICAL ROCKET STATION AT McMURDO, ANTARCTICA AS AN ACTIVITY OF U.S. ANTARCTIC RESEARCH PROGRAM
Ralph A. Rotolante, Raymond S. Briggs, and James F. Bettle. Oct 63, 60p
Grant NSF-G19284
OTS $5.60

DESCRIPTORS: *Sounding rockets, Rockets, Launching sites, *Weather stations, *Antarctic regions, Meteorology, Test equipment, Test methods

The problems encountered during the establishment of a meteorological rocket site at McMurdo, Antarctica, are discussed. Research methods and procedures are detailed; the equipment used is described. The temperature and wind profiles obtained during the first series of rocket firings are included. (Author)

PB-166 037
Schellenger Research Labs., Texas Western Coll., El Paso.
METEOROLOGICAL ROCKET DATA PROFILE OF THE STRATOSPHERE, McMURDO, ANTARCTICA
Ralph A. Rotolante and Alice Marie Parra. Mar 64, 55p
Grant NSF-G19284
OTS $5.60

DESCRIPTORS: *Atmospheric sounding, *Stratosphere, *Sounding rockets, Atmospheric motion, Atmospheric temperature, Meteorology, Weather stations, *Antarctic regions

A brief description of the stratospheric circulation and temperature structure at McMurdo, Antarctica, in 1962, is presented. Special emphasis is given to the period 27 September-3 October 1962, the period of rapid stratospheric warming that year. Also included are the wind and temperature profiles obtained by the Antarctic Meteorological Rocket Program during its initial year. (See also PB-165 965)

ENGINEERING

TID-7677
Atomic Energy Commission, Oak Ridge, Tenn. Div. of Technical Information Extension.
AEC AIR CLEANING CONFERENCE (8th) HELD AT OAK RIDGE NATIONAL LABORATORY, OCT. 22-25, 1963.
B. H. Kornegay, D. K. Jamison, and J. M. Morgan, Jr. ed. 694p
OTS $7.00

DESCRIPTORS: *Conferences, Air, *Health physics, Safety, Dust, Hazards.

N64-18293
Battelle Memorial Inst., Columbus, Ohio.
ENGINEERING PROPERTIES OF POTASSIUM. Final rept.
A. W. Lemmon, Jr., H. W. Deem, E. A. Eldridge, E. H. Hall, and J. Matolich, Jr. 31 Dec 63, 83p
Contract NAS5-584
BATT-4673-FINAL; NASA CR-54017
OTS $8.10

DESCRIPTORS: *Potassium, Thermodynamics, Transport properties.

N64-18294
Battelle Memorial Inst., Columbus, Ohio.
THE SPECIFIC HEAT, THERMAL CONDUCTIVITY, AND VISCOSITY OF LIQUID CESIUM.
A. W. Lemmon, Jr., H. W. Deem, E. A. Eldridge, E. H. Hall, and J. Matolich, Jr. 29 Feb 64, 39p
Contract NAS5-584
BATT-4673-T7; NASA CR-54018
OTS $3.60

DESCRIPTORS: *Cesium, *Liquid metals, Specific heat, Thermal conductivity, Viscosity.

Physical Chemistry

AD-431 013 repriced
Air Products and Chemicals, Inc., Allentown, Pa.
INVESTIGATION OF THE PARA-ORTHO SHIFT OF HYDROGEN. Final rept. Mar-Sep 62
R. G. Clark, J. F. Kucirka, A. Jambhekar, and G. E. Schmauch. Oct 63, 52p
Contract AF33(616)7506
ASD-TDR-62-833, pt. 2; N64-16608
OTS $1.50

DESCRIPTORS: *Liquefied gases, *Hydrogen, Thermodynamics, *Cryogenics, *Heat transfer, *Catalysts, Heat of activation, Particle size, Adsorption, Separation, Magnetic properties, Refrigeration systems, Air-breathing engines (Unconventional), *Propellants

Investigations of the low-temperature, heterogeneous catalysis of the para-ortho shift of hydrogen for the recovery of the endothermic heat of conversion as low-temperature refrigeration are reported. The research program included: studies of the effects of catalyst activation temperature, particle size, and chamber diameter on conversion activity; adsorption studies; the determination of separation factors of advanced catalysts; and preliminary work to determine the magnetic properties of advanced catalysts. An extensive catalyst development program resulted in improved catalyst systems for the conversion. The most advanced catalyst shows an activity 10.5 times more effective, on a weight basis, than hydrous ferric oxide gel which is the best commercial catalyst available for the conversion. (Author)

PB-181 685
Monsanto Research Corp., Everett, Mass.
THERMODYNAMIC PROPERTIES OF SALINE WATER
W. H. Power and B. M. Fabuss. Jul 64, 92p
Contract 14-01-0001-294
Saline Water Research and Development Progress rept. no. 104
OTS $2.25

DESCRIPTORS: *Sea water, Desalination, Thermodynamics, *Thermochemistry, Calcium compounds, Sulfates, Hydrates, Solubility.

Results are presented of studies on the solubility of calcium sulfate and its hydrates (gypsum, selenite, α-hemihydrate, β-hemihydrate) in pure water and in saline waters from 25-250°C.

EARTH SCIENCES

AD-429 500
Brown Univ., Providence, R. I.
THE VISCOSITY OF DRY AND HUMID AIR
J. Kestin and J. H. Whitelaw. Jan 64, 31p
Contract Nonr-3623(00)
Proj. Squid Technical rept. BRN-12-P; N64-16090
OTS $3.60

DESCRIPTORS: *Air, Viscosity, Humidity, Fluid flow, Measurement,

The results of new measurements on the viscosity of dry air along seven isotherms in the range 25 - 250°C and 1 to 140 atm, subject to an uncertainty of ±0.4% are presented. The zero-density viscosity of dry air can be fitted within the experimental error by an interpolation formula based on the Lennard-Jones 6 - 12 potential. The apparent molecular constants which lead to a good fit differ considerably from those quoted in the literature. The effect of pressure can be accounted for, at least approximately, by adding a cubic polynomial function of density to the zero-density viscosity. This function, known as the excess viscosity $\Delta\mu$, is independent of temperature, certainly in the range 25 - 100°C. Measurements of the viscosity of mixtures of air and water vapour are also presented. These are restricted to a nominal pressure of 1 atm and cover a range of molar fractions from zero to 0.03 at 25°C and zero to unity at 250°C. Measurements were performed along the six isotherms 25, 50, 75, 150, 200 and 250°C. It is believed that these are the first measurements of this kind. (Author)

N64-18437
Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
THE LOCAL TIME DEPENDENCE OF THE NON-STORMER CUT-OFF FOR 1.5 MeV PROTONS IN THE QUIET GEOMAGNETIC FIELD
Edward C. Stone (Doctoral thesis). Feb 64, 49p
Grant NsG-179-61; Contract AF49(638)1008; Grant AF AFOSR-62-23
EFINS-64-14; NASA CR-53584
OTS $4.60

DESCRIPTORS: Terrestrial magnetism, *Protons, Penetration.

N64-17574
New Hampshire Univ., Durham.
EXPLORER XII OBSERVATIONS OF MAGNETIC SUDDEN IMPULSES IN THE EARTH'S MAGNETOSPHERE
Atsuhiro Nishida (Chicago Univ.) and J. H. Young. [1963] 9p
Contract NASw-155; Grant NSF GP-797
NASA CR-53231
OTS $1.10

DESCRIPTORS: *Upper atmosphere, Terrestrial magnetism, *Magnetic fields.

N64-17789
New Hampshire Univ., Durham.
PRELIMINARY RESULTS OF MAGNETIC FIELD MEASUREMENTS IN THE TAIL OF THE GEOMAGNETIC CAVITY
Laurence J. Cahill, Jr. [1963] 10p
Contract NASw-155
NASA CR-53342
OTS $1.10

DESCRIPTORS: *Terrestrial magnetism, *Magnetic fields.

AD-425 712
Speas (R. Dixon) Associates, Manhasset, N. Y.
ANALYSIS VOLUME - ATA DELAY DATA PROGRAM. Final rept.
R. D. Speas, M. H. Smith, A. C. Botsford, E. A. Cutrell, and D. S. Little. Oct 63, 207p
Contract FA-WA-4456, FR
FAA Task-150-004-00S; N64-15670
OTS $14.00

DESCRIPTORS: Civil aviation, *Air traffic, Terminal flight facilities, *Time studies, Data processing systems, Punched cards, Analysis, Air traffic control systems,

An analysis of the principal areas of delay experienced by airlines and airports in the United States is presented. The program involved the collection of airline delay data during April and May 1963 and the subsequent machine processing and analysis of the information. The purpose of the study is to provide insight into and interpretation of the size and complexity of the airline delay problem and to form the basis for a recommended program of corrective action. To accomplish this objective, many different machine tabulations and analyses were made. (Author)

AD-425 627
Speas (R. Dixon) Associates, Manhasset, N. Y.
SUMMARY VOLUME - ATA DELAY DATA PROGRAM. Final rept.
R. D. Speas, M. H. Smith, A. C. Botsford, E. A. Cutrell, and D. S. Little. Oct 63, 51p
Contract FA-WA-4456
FAA Task 150-004-00S; N64-12385
OTS $5.60

DESCRIPTORS: Civil aviation, *Air traffic, Terminal flight facilities, *Time studies, Data processing systems, Punched cards, Analysis, Air traffic control systems,

See also AD-425 712

PB-166 032
Special Committee on Airships, NAS-NRC, Washington, D. C.
GENERAL REVIEW OF CONDITIONS AFFECTING AIRSHIP DESIGN AND CONSTRUCTION WITH RECOMMENDATIONS AS TO FUTURE POLICY. REVIEW AND ANALYSIS OF AIRSHIP DESIGN AND CONSTRUCTION PAST AND PRESENT. 16 Jan 36, 30 Jan 37, 221p
NAS-NRC SCA-1, SCA-2; AD-223 448
OTS $15.00

DESCRIPTORS: *Airships, Airframes, Construction, Aerodynamic configurations, Aerodynamic characteristics, Aerodynamic control surfaces, Aerodynamic loading, Stresses, Pressure, Fins, Aviation safety, Propulsion, Storms, Turbulence, Gusts, Bibliographies, Design, Research program administration,

PB-166 034
Special Committee on Airships, NAS-NRC, Washington, D. C.
THE METAL-CLAD TYPE OF AIRSHIP CONSTRUCTION WITH RECOMMENDATIONS. 11 Aug 36, 6p
NAS-NRC-SCA-4; AD-223 450
OTS $1.10

DESCRIPTORS: *Airships, *Airship envelopes, Metal plates, Metal coatings, Aerodynamic characteristics, Acceptability, Design, Airframes,

The distinctive feature of the metal-clad type of construction, especially in the smaller sizes, is that the stresses due to aerodynamic pressure and due to bending moments in the structure as a whole are carried largely by the outer metal skin, maintained in operative condition by a moderate excess of pressure within the envelope over that of the air without.

PB-166 035
Special Committee on Airships, NAS-NRC, Washington, D. C.
THE RESPESS TYPE OF AIRSHIP CONSTRUCTION WITH RECOMMENDATIONS. 11 Aug 36, 10p
NAS-NRC-SCA-5; AD-223 451
OTS $1.10

DESCRIPTORS: *Airships, Airframes, Wire, Aerodynamic configurations, Feasibility studies, Stresses, Mathematical analysis, Design.

A review is presented of structural problems involved in the Respess type of airship construction. This airship comprises, in essence, a surface longitudinal series of members (wires) always in tension, with the resultant reaction carried by an axial longitudinal member in compression. An examination of the design, so far as it is developed or described fails, to furnish any convincing demonstration of these claimed advantages or indeed to provide any reasonable basis for satisfactory comparison with airships of the Zeppelin type of the same size. (Author)

PB-166 033
Special Committee on Airships, NAS-NRC, Washington, D. C.
TECHNICAL ASPECTS OF THE LOSS OF THE MACON. 30 Jan 37, 45p
NAS-NRC-SCA-3; AD-223 449
OTS $4.60

DESCRIPTORS: *Airships, Air frames, Structural properties, Stresses, Failure (Mechanics), Storms, Turbulence, Gusts, Fins, Flight paths, *Aviation accidents,

The sequence of the events leading up to and through the period of the airship's disaster, including conclusions as to the location and character of the initial break, its immediate cause, and judgment as to the existence and cause of such predisposing conditions as may have determined failure at the particular point indicated. (Author)

AD-410 346
[National Aeronautical Establishment] Ottawa (Canada).
INVESTIGATION OF THE RESISTANCE AND DIRECTIONAL STABILITY OF FOUR PAPER BARGES
C. G. Benckhuysen. Feb 63, 20p
Test rept. MET-399; N. R. C. no. 7353
OTS $1.60

DESCRIPTORS: *Barges, *Paper, *Marine engineering, Hulls (Marine), Stability, Tests, Fluid dynamic properties, Drag.

The resistance and directional stability of four paper barges have been measured at three speeds in still water, and at one speed in three different regular wave systems. The influence of varying the skeg angle on resistance and stability, on course, has been assessed. (Author)

AD-418 249
National Research Council of Canada, Ottawa. Div. of Mechanical Engineering.
AN EXTENSOMETER CALIBRATOR
G. E. Rickwood. Aug 63, 6p
Mechanical Engineering rept. MH-102; N. R. C. no. 7577
OTS $1.10

DESCRIPTORS: *Extensometers, *Calibration, Meters, Measurement, Strain gages, Vibration, Wire, Mounting brackets

A device suitable for producing and measuring linear extensions of the order of one microinch (0.025 micron) over a range of ±0.0035 inch (0.09 mm.) is described. Provision is made for referring the measurements to gauge blocks. Originally designed to permit calibrating vibrating-wire strain gauges, it is readily adaptable to calibrating other types of extensometers and strain gauges by the addition of suitable mounting blocks. (Author)

OTS SB-514 Revised
Office of Technical Services, Dept. of Commerce, Washington, D. C.
ENGINEERED PERFORMANCE STANDARDS. Apr 64, 3p
OTS Selective Bibliography SB-514, rev.
OTS $0.10

DESCRIPTORS: *Bibliographies, Handbooks, *Performance (Human), Standards, *Job analysis, Engineers, Maintenance personnel.

Lists 29 engineered performance standards developed by U. S. Navy Bureau of Yards and Docks engineers for all crafts in public works maintenance. The standards (handbooks and formulas) are based on a detailed analysis of the work required in building maintenance, machine repair and related work in a variety of trades at Navy installations. Each step in a given job is laid out in detail; publications can thus be used for planning and estimating a wide range of jobs in maintenance, repair, or construction.

AD-428 236
National Aeronautical Establishment, Ottawa (Canada).
AN INVESTIGATION OF THE EFFECTS OF LATERAL-DIRECTIONAL CONTROL CROSS-COUPLING ON FLYING QUALITIES USING A V/STOL AIRBORNE SIMULATOR
D. M. McGregor. Dec 63, 30p
Aeronautical rept. LR-390; N. R. C. 7778; N64-14203; N64-14737
OTS $2.60

DESCRIPTORS: *Aerodynamic characteristics, Control systems, *Vertical take-off planes, *Short take-off planes, *Aerodynamic control surfaces, Tests, *Flight simulators, Airborne, Pilots, Motion, Handling.

Since many V/STOL aircraft being proposed, or under development, have potentially serious lateral-directional control cross-coupling effects, a handling qualities investigation was undertaken to determine the variation of pilots' opinion with these parameters. A visual flight task which included hovering, accelerating and decelerating transitions, and steep angle approaches was used to give the pilots a realistic function to perform while assessing the various configurations. The results indicate quite a small area on the control cross-coupling graph over which the pilots' ratings were in the Normal Operation region, but a very large region for Emergency Operation. A preference was indicated in both these regions for negative roll due to the pilots' yaw command input and the shape of the emergency operation region showed that the pilots were more readily able to cope with favourable yaw due to roll input. (Author)

AD-279 581
National Aeronautical Establishment, Ottawa (Canada).
A METALLURGICAL STUDY OF SUSPECTED FATIGUE IN A MAGNESIUM ALLOY WHEEL CASTING
R. Smallman-Tew. Feb 62, 21p
Aeronautical rept. LR-333; N. R. C. no. 6745
OTS $2.60

DESCRIPTORS: *Landing gear, *Wheel hubs, Failure (Mechanics), *Castings, Magnesium alloys, Aluminum alloys, Heat treatment, Fatigue (Mechanics), Metallography, Chemical analysis.

As a result of the reported failure of several landing wheels of a twin-engined transport aircraft, in which fatigue was thought to have been a prime factor, a metallurgical examination was carried out on a duplicate wheel to those which had failed. The investigation revealed that a difference of about 1.5 percent in the aluminum content of the magnesium casting alloy, used in these wheels, has a significant effect on the heat treatment response of the alloy and on its fatigue properties, especially under direct stress. It is suggested that the alloy may have undergone partial aging through heat conducted into the wheel from the brake assembly and that the resulting modification of structure was responsible for the considerable drop in fatigue endurance which was determined. It is concluded that the reported failures are traceable to the choice of AZ91C magnesium alloy, which was used for this application, and that a change to AZ80 magnesium alloy, in the T4 condition, would be advantageous. (Author)

A research investigation was undertaken in order to study the mechanisms of mass transfer in an ionic solution in which both temperature and concentration gradients coexist. Measurements and theoretical predictions were made of the ordinary and thermal diffusion properties of several saline water systems, including sea water. A study was made of the macroscopic transport mechanisms which determine the degree and rate of separation of water from saline solutions contained in the packed slit of a thermogravitational column. The results show that the mass diffusion properties of solutions similar to sea water, and of sea water itself, are markedly dependent on temperature. Their variation with concentration is relatively slight. The results also indicate that the thermal and ordinary diffusion coefficients of sea water are not as large as those of the sodium chloride-water system at similar conditions of temperature and concentration. Multicomponent effects in these systems are of considerable importance. Both theoretical and experimental evidence indicates that ions diffuse at significantly different rates, and sometimes in opposite directions, depending upon whether the ion is in a binary or multicomponent ionic solution. (Author)

PB-181 682
Richardsons Westgarth and Co., Ltd. Wallsend-on-Tyne (England).
CHAMBER GEOMETRY IN MULTI-STAGE FLASH EVAPORATORS
Jul 64, 103p
Contract 14-01-0001-262
Saline Water Research and Development progress rept. no. 108
OTS $2.50

DESCRIPTORS: *Desalination, *Sea water, *Evaporators, Distillation, Distilling plants

An investigation was made of the importance of various parameters on the length of a typical stage in a multi-stage sea water flash evaporator. For a set of standard conditions, the chamber efficiency was found at different chamber lengths, and from this, an optimum length established, such that vapourisation was complete. Each parameter was examined over a range of values to determine its influence on chamber length. Data obtained was expressed in the form of curves of efficiency vs. chamber length, and from these, constant efficiency curves were plotted for a given parameter. Finally, an empirical equation was derived from the basic test data, to give an indication of the chamber length required for complete flash-off in a stage for a specified range of conditions. This equation was confirmed, within this range, by operation at arbitrary conditions. (Author)

PB-181 683
Southern Research Inst., Birmingham, Ala.
DESALINATION BY ELECTROSORPTION AND DESORPTION. Rept. for 27 Jul-22 Nov 63
Robert E. Lacey and Edward W. Lang. Jul 64, 42p
Contract 14-01-0001-335
Research and Development progress rept. no. 106
OTS $1.25

DESCRIPTORS: *Desalination, *Sea water, Membranes, Ion exchange, Ion exchange resins, Coatings, Sorption

Preliminary evaluation of the electrosorption process has been completed and it has been shown that saline water can be demineralized by electrosorption efficiently and possibly at a lower cost than that for electrodialysis. Feed water containing 3500 ppm of sodium chloride can easily be demineralized to product water containing 400 ppm by the electrosorption process. The regeneration part of the electrosorption cycle requires appreciably less time than the demineralization part of the cycle, possibly as little as 25% of the total cycle time. Methods were developed for making electrosorption membranes with good electrochemical properties by coating base films with condensation-type ion-exchange resins, but these have not been used in demineralization experiments Some progress was made in developing the theoretical basis of the process, but more study is needed to develop expressions that adequately describe performance. (Author)

PB-181 681
Stearns-Roger Mfg. Co., Denver, Colo.
SALINE WATER DEMONSTRATION PLANT NO. 1, FREEPORT, TEXAS. Annual rept. no. 2, Jul 62-Jun 63. Mar 64, 96p
Contract 14-01-001-218
Saline Water Research and Development progress rept. no. 100
OTS $2.25

DESCRIPTORS: *Distilling plants, *Sea water, *Desalination, Heat exchangers, Costs, Maintenance, Production, Marine biology.

The Freeport Salt Water Conversion Plant was evaluated technically, logistically, and economically. The plant utilizes the long-tube, multiple-effect, distillation process to convert raw sea water to potable water. (See also PB-181 466)

Civil Engineering

AD-272 653
Massachusetts Inst. of Tech., Cambridge.
EFFECTS OF RATE OF STRAIN ON STRESS-STRAIN BEHAVIOR OF SATURATED SOILS. Rept. no. 6 on The Response of Soils to Dynamic Loads
Archie M. Richardson, Jr. Apr 61, 91p
Contract DA22-079-eng-224
Rept. no. DASA-1237
OTS $8.60

DESCRIPTORS: *Soils, *Soil mechanics, Stresses, Pressure, Clay, Strain (Mechanics),

The report describes one portion of the Soil Dynamics Research effort in which investigations were made of the effect of strain rate on the stress vs. strain behavior of two saturated soils. Included in the report are: (a) The results and analysis of a series of "static" triaxial compression tests on a saturated Loess, (b) The results and analysis of a series of rapid triaxial compression tests on a saturated Loess, and (c) The results and analysis of a series of rapid triaxial compression tests on a saturated clay. The "static" triaxial tests were important in describing the patterns of behavior of the soil during very slowly applied stresses and served as prerequisites to the rapid triaxial tests. The tests performed at rapid rates of strain were of a preliminary nature and the conclusions drawn are to be used in planning a comprehensive program investigating the effects of strain rate on the stress-strain behavior of saturated soil. (Author) (See also AD-255 708)

Chemical Engineering

ANL-5896
Argonne National Lab., Ill.
CHEMICAL ENGINEERING DIVISION SUMMARY REPORT FOR APRIL-JUNE, 1958. Oct 58, declassified 28 Mar 60, 178p
Contract W31-109-eng-38
OTS $13.00

ANL-6818
Argonne National Lab., Ill.
THE EBR-II SKULL RECLAMATION PROCESS. PART I. GENERAL PROCESS DESCRIPTION AND PERFORMANCE.
Leslie Burris, Jr., I. G. Dillon, and R. K. Steunenberg. Jan 64, 28p
Contract W31-109-eng-38
OTS $0.75

NAA-SR-8381
Atomics International, Canoga Park, Calif.
PHASE EQUILIBRIA-FREE ENERGY RELATIONSHIPS IN LIQUID SODIUM SYSTEMS
D. L. Johnson. [15 Apr 64] 40p
Contract AT(11-1)GEN-8
OTS $1.00

PB-181 684
Burns and Roe, Inc., New York.
SALINE WATER CONVERSION DEMONSTRATION PLANT NO. 2, SAN DIEGO, CALIFORNIA. Annual rept. no. 1, Jan 62-Jun 63. Feb 64, 222p
Contract 14-01-0001-233
Saline Water Conversion progress rept. no. 102
OTS $3.50

DESCRIPTORS: *Distilling plants, *Desalination, *Sea water, Marine biology, Maintenance, Operation, Costs, Corrosion.

History, organization, plant operation and maintenance, problem areas, achievements and recommendations, and costs and production of the San Diego conversion demonstration plant No. 2 are given.

PB-181 686
General Electric Co., Burlington, Vt.
ECONOMIC AND TECHNICAL EVALUATION OF THE WIPED FILM EVAPORATOR
Ralph E. Anderson and Charles W. Lotz. Jul 64, 39p
Contract 14-01-0001-248
Saline Water Research and Development progress rept. no. 105
OTS $1.00

DESCRIPTORS: *Sea water, *Desalination, *Evaporators, Heat transfer, Condensation, Thin films, Material removal, Tests, Feasibility studies, Costs.

MCW-1454
Mallinckrodt Chemical Works, Weldon Spring, Mo.
MINIMUM SAMPLE SIZES FOR URANIUM CONCENTRATE SAMPLING
S. D. Nelson, T. J. Kneip, and A. H. Mohl. 30 Apr 64, 16p
Contract W14-108-eng-8
OTS $0.50

PB-181 680
Mason - Rust, Webster, S. D.
SALINE WATER DEMONSTRATION PLANT NO. 3, WEBSTER, SOUTH DAKOTA. Annual rept. no. 1, 9 Mar 62-30 Jun 63
Mar 64, 143p
Contract 14-01-001-225
Saline Water Research and Development progress rept. no. 101
OTS $2.75

DESCRIPTORS: *Industrial plants, *Desalination, *Electrodialysis, *Sea water, Salinity, Membranes, Operation, Maintenance, Costs

History, maintenance, process analysis, and economic evaluation for the South Dakota saline water demonstration plant no. 3 are given.

ORNL-3495
Oak Ridge National Lab., Tenn.
REVIEW OF THORIUM RESERVES IN GRANITIC ROCK AND PROCESSING OF THORIUM ORES
K. B. Brown, D. J. Crouse, F. J. Hurst, and W. D. Arnold [Dec 62] 25p
Contract W7405-eng-26
OTS $0.75

K-1594
Oak Ridge Gaseous Diffusion Plant, Tenn.
A VACUUM DISTILLATION SYSTEM FOR CONCENTRATING HEAT-LABILE SOLUTIONS
R. H. Stevens. 8 May 64, 25p
Contract W7405-eng-26
OTS $0.50

PB-165 307
Office of Saline Water, Washington, D. C.
"AS BUILT" DRAWINGS FOR SPECIFICATIONS NO. 212.
Rept. on Two-Hundred and Fifty Thousand Gallon Per Day Electrodialysis Brackish Water Conversion Plant at Webster, South Dakota. 26 Mar 64, 336p
Contract 14-01-001-212
Specifications no. 212
OTS $19.75

DESCRIPTORS: *Industrial plants, *Desalination, *Electrodialysis, *Sea water, Salinity, Specifications.

See also PB-158 613, PB-155 639

PB-181 687
Philco Research Labs., Newport Beach, Calif.
INVESTIGATION OF THERMAL DIFFUSION FOR SALINE WATER CONVERSION
John L. Richardson. Jul 64, 217p
Contract 14-01-0001-297
Saline Water Research and Development progress rept. no. 107
OTS $3.50

DESCRIPTORS: *Sea water, *Desalination, *Thermal diffusion, Transport properties, Salinity, Ions, Temperature, Equations.

The Automatic Flight Control Analyzer AN/ASM-103 is used in two separate capacities; to checkout the Automatic Flight Control Set AN/ASW-20 (AFC Set) and to checkout the Landing Assist Device (LAD) coupler as a unit. During checkout of the AFC Set, the Test Instrument simulates outputs of the Command Signals Decoder KY-476/ARW-78 (part of Radio Receiving Set AN/ARW-78), provides switch closures and voltages to simulate other inputs, and monitors response of the AFC Set to simulated or actual inputs.

PB-181 688
Bureau of Naval Weapons, Washington, D. C.
CONTROL MONITOR TEST SET AN/ASM-106, PART NO. 421850-01-01 AND CONTROL MONITOR C-4298/ASW-20, PART NO. 421900-01-01. 15Mar 64, 25p
Instrument Calibration Procedure manual NAVWEPS 17-20QK-01
OTS $0.75

DESCRIPTORS: *Test sets, *Monitors, Control, Instrumentation, Calibration, Electrical equipment.

This manual contains calibration instructions that will enable calibration personnel to determine whether the equipment is operating within the prescribed specification limitations. It also includes a list of calibration equipment, corrective action instructions, and instructions for the evaluation and recording of data.

PB-181 691
Bureau of Naval Weapons, Washington, D. C.
ELECTRONIC CONTROL AMPLIFIER TEST SET AN/ASM-104, PART NO. 420681-01-01. 15 Mar 64, 26p
Instrument Calibration Procedure manual NAVWEPS 17-20QT-04
OTS $0.75

DESCRIPTORS: *Test sets, *Electron multipliers, *Servo amplifiers, Flight control systems, Electronic equipment, Instrumentation, Calibration,

The Electronic Control Amplifier Test Set AN/ASM-104 is used for making operational tests and pre-operational adjustments of the yaw, roll, pitch, and collective axes of Electronic Control Amplifier AM-3082/ASW-20 (part of Automatic Flight Control Set AN/ASW-20). The Test Instrument provides simulated operational input signals and monitors output currents for each of the four axes and, in conjunction with an external ac voltmeter, provides a means of selecting and monitoring various power and signal voltages.

PB-181 692
Bureau of Naval Weapons, Washington, D. C.
ELECTRONIC CONTROL AMPLIFIER TEST SET AN/ASM-108, PART NO. 421 290-01-01. 15 Mar 64, 17p
Instrument Calibration Procedure manual NAVWEPS 17-20QT-05
OTS $0.50

DESCRIPTORS: *Test sets, *Electron multipliers, *Servo amplifiers, Flight control systems, Electronic equipment, Instrumentation, Calibration,

This manual contains calibration instructions that will enable calibration personnel to determine whether the equipment is operating within the prescribed specification limitations. It also includes a list of calibration equipment, corrective action instructions, and instructions for the evaluation and recording of data.

PB-165 322
Clevite Corp., Cleveland, Ohio.
CERAMIC I-F TRANSFORMERS. Quarterly rept. no. 5, 1 Jun-31 Aug 61
D. J. Koneval and D. R. Curran. 6 Oct 61, 33p
Contract DA36-039-sc-85346
Rept. no. 20
OTS $3.60

DESCRIPTORS: *Band-pass filters, Ceramic materials, *Intermediate frequency transformers, Piezoelectric materials, *Cavity resonators, *Miniature electronic equipment, Manufacturing methods, Packaging, Reliability (Electronics), Electrodes, Radiofrequency filters

An alternate tuning method, suitable for handling small lots of miniature ceramic radial resonators in the 1 to 6 Mc range, has been developed. These resonators, packaged in micro-module "slot" packages have been subjected without damage to high frequency vibration tests. The problem of maintaining stop band rejection when packaging five-resonator filter sections in a single micro-module section is discussed. Introduction of a ground plane and appropriate shielding within the module appears to be at least a partial solution. Substantial increases in stop band rejection have been obtained with resonator-capacitor filter sections. A ceramic suitable for use as Uni-Wafer filters has been developed internally. Dot-resonators fabricated using this material have improved temperature and impedance characteristics over their previous counterparts. The use of the photo resist technique to produce electrode configurations on the ceramic wafer and spot electroplating to tune the dot-resonator is discussed. (Author) (See also AD-262 220)

PB-165 323
Clevite Corp., Cleveland, Ohio.
CERAMIC I-F TRANSFORMERS. Final rept., 1 Jun 60-31 Dec 61
D. R. Curran and D. J. Koneval. 20 Feb 62, 160p
Contract DA36-039-sc-85346
Rept. no. 21
OTS $11.50

DESCRIPTORS: *Band-pass filters, Ceramic materials, *Intermediate frequency transformers, Piezoelectric materials, *Cavity resonators, *Miniature electronic equipment, Manufacturing methods, Packaging, Reliability (Electronics), Electrodes, Radio frequency filters,

Range of applicability of radial modes of vibration in piezoelectric ceramic disks has been extended to 6 Mc. With these radial resonators, ceramic ladder filters can now be realized with bandwidths from 0.5 to 9% for center frequencies below 2 Mc and from 0.5 to 3% between 2 and 6 Mc. Filters within the 1 to 6 Mc range have been packaged in the micro-module configuration with 3 or 5 resonators per section (dependent on frequency). In either case, a packaged 18 to 20 resonator ladder filter with 70 db of stop band rejection and 60 db/6db skirt ratio less than 2, occupies a total volume of 1/32 cubic inch. Sources of spurious responses

PB-165 324
Southwest Research Inst., San Antonio, Tex.
VULNERABILITY OF POL STORAGE TANKS TO BLAST
Robert C. DeHart and Nicholas L. Basdekas.
25 Mar 60, 172p
Contract DA49-146-XZ-003
SwRI Proj. no. 830-2; DASA-1182
OTS $12.50

DESCRIPTORS: *Storage tanks, *Blast, Petroleum, Mathematical analysis, Structures, Roofs, Structural parts, Nuclear weapons.

Contents:
Determination of the blast resistance of petroleum storage tanks
Summary of computational procedure
Investigation of means of simplifying analysis and design procedure
Blast resistance of typical floating and cone roofs
Blast resistance of hardened floating roof
Blast resistance of tank appurtenances

Electrical and Electronic Engineering

PB-166 024
Air Force Cambridge Research Labs., Bedford, Mass.
ANTENNA FOR VOLIR
E. B. Chisholm. Dec 50, declassified 15 May 63, 51p
E5662; ATI-112 473
OTS $5.60

DESCRIPTORS: *Radar antennas, S band, Design, Performance (Engineering), Antennas.

The purpose, development, design, and performance of an S-band antenna for Volir are described in detail. The antenna consists of a 30-foot by 30-foot cylindrical parabolic reflector fed by a vertical lens pillbox line source of aperture 25 feet by 1 1/2 inches. Twenty-one beams are obtained in elevation by feeding the lens pillbox with as many horns spaced 0.75° apart. The antenna is horizontally polarized, and each beam has a half-power width of approximately 0.75° in both planes. This arrangement provides elevation angle coverage from 0° to 15°, but the antenna is designed so that the number of horns and the elevation coverage can be doubled. The system, with auxiliary computing and receiving circuits, is anticipated to give elevation angle discrimination to an accuracy of 1/10 beam spacing, with a possibility of realizing an accuracy of 1/30 beam spacing. (Author)

PB-165 963
Air Force Flight Test Center, Edwards AFB, Calif.
TEST AND EVALUATION OF A 2200 MC. PARAMETRIC AMPLIFIER. Final rept.
John T. Conley. Jun 63, 14p
FTC-TDR-63-22
OTS $1.60

DESCRIPTORS: *Telemeter systems, Ultrahigh frequency, *Microwave amplifiers, S band, *Parametric amplifiers, Airborne, Spaceborne, Remote control systems, Gain, Bandwidth, Noise (Radio), Sensitivity.

The report documents test and evaluation of a remotely-tuned, conventional 2200 Mc. parametric amplifier designed for general range support of test aircraft and vehicles using UHF telemetry. Laboratory tests conducted at the Air Force Flight Test Center are discussed as is the operational suitability of the device. Test equipment layouts and test data are included. It is concluded that the performance of the parametric amplifier in a laboratory environment is satisfactory, but that is is not suited for operational use due principally to the need for complicated adjustment to achieve optimum performance. It is recommended that this parametric amplifier development program be abandoned and that future effort be directed toward application of solid state, low-noise amplification techniques to the solution of the UHF radio telemetry acquisition problem. (Author)

PB-181 689
Bureau of Naval Weapons, Washington, D. C.
ALTITUDE CONTROL TEST SET AN/ASM-141, PART NO. 18 0001 00360. 15 Mar 64, 16p
Instrument Calibration Procedure manual NAVWEPS 17-20QT-02
OTS $0.50

DESCRIPTORS: *Test sets, *Automatic pilots, Flight control systems', Altitude chambers, High altitude, Instrumentation, Calibration, Electrical equipment,

The Altitude Control Test Set AN/ASM-141, Part No. 18-0001-00360, provides input power, simulated load, metering facilities, circuitry and controls, necessary for the performance of over-all functional test to ensure functional operation of Automatic Pilot Altitude Control C-4748/ASW-20 (part of Automatic Flight Control Set AN/ASW-20).

PB-181 693
Bureau of Naval Weapons, Washington, D. C.
ALTITUDE CONTROLLER TESTER MODEL VPT-10G, PART NO. ST-11414. 15 Mar 64, 14p
Instrument Calibration Procedure manual NAVWEPS 17-20QT-07
OTS $0.50

DESCRIPTORS: *Test sets, *Flight control systems, *Altimeters, Model tests, Instrumentation, Calibration, Electrical equipment,

The Altitude Controller Tester VPT-10G is a portable, self-contained, regulated static pressure source functioning as a leak tester of the altitude controller static system. The Test Instrument consists of a motor pump assembly, an oil reservoir, a static control valve, two differential relief valves, a needle valve, altimeter, and an electrical power system.

PB-181 690
Bureau of Naval Weapons, Washington, D. C.
AUTOMATIC FLIGHT CONTROL ANALYZER AN/ASM-103, PART NO. 421830-01-01. 15 Mar 64, 36p
Instrument Calibration Porcedure manual NAVWEPS 17-20QT-03
OTS $1.00

DESCRIPTORS: *Flight control systems, Automatic pilots, Automatic navigators, Instrumentation, Calibration, Landing aids, Electrical equipment,

PB-166 020
Applied Mathematics Panel, Office of Scientific Research and Development.
PROBABILITY AND STATISTICAL STUDIES IN WARFARE ANALYSIS. Summary technical rept., vol. 3
S. S. Wilks, ed. 1946, declassified 27 Oct 60, 113p
Contract OEMsr-1131
OTS $9.10

DESCRIPTORS: *Warfare, Analysis, *Probability, *Applied mathematics, Military research, *Bombing, Torpedo attack, Aerial warfare, Land mines, Heat homing, Statistical processes,

This volume furnishes a summary of the principal results of only a portion of the probability and statistical investigations made by the Applied Mathematics Panel during World War II. The work of the Panel in mathematical statistics may be classified into four major categories: (1) bombing accuracy studies, (2) development of statistical methods in inspection, research, and development work, (3) development of new fire effect tables and diagrams for the Navy, and (4) miscellaneous studies relating to spread angles for torpedo salvos, lead angles for aerial torpedo attacks against maneuvering ships, land mine clearance, performance of heat-homing devices, search problems, verification of weather forecasting for military purposes, procedures for testing sensitivity of explosives, distribution of Japanese balloon landings, etc.

AD-266 429
Atlas Chemical Industries, Inc., Tamaqua, Pa.
DESCRIPTION OF MANUFACTURE FOR PLUG, DETONATOR, T-24E1, R-F, PROTECTIVE
Ray A. Dietrich and Louis A. Dignazio. 27 Jun 60, rev. 1 Aug 61, 31p
Contract DA36-034-501-ORD-3147RD
Ordnance Management Structure no. 557
OTS $3.60

DESCRIPTORS: Materials, Specifications, Manufacturing methods, *Detonators, *Ordnance, *Electric connectors, Electric insulation, Iron, Powder metlas, Radiofrequency, Attenuation, Electrochemistry, Phosphoric acids, Acetones, Electromagnetic shielding

Identifier: T-24E1 detonator

NASA-TN-D-2270
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
FLIGHT TEST PERFORMANCE AND DESCRIPTION OF A ROCKET VEHICLE FOR PRODUCING LOW-SPEED ARTIFICIAL METEORS
Clarence A. Brown, Jr. and Jean C. Keating. Apr 64, 47p
N64-19227
OTS $1.25

DESCRIPTORS: *Re-entry vehicles, Flight testing, *Meteors,

NASA-TR-R-155
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
SPIN DYNAMICS OF MANNED SPACE STATIONS
Peter R. Kurzhals and Claude R. Keckler. Dec 63, 61p
N64-19292
OTS $1.50

DESCRIPTORS: Manned, *Space stations, *Spin,

NASA-TN-D-2053
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
A WIND-COMPENSATION METHOD AND RESULTS OF ITS APPLICATION TO FLIGHT TESTS OF TWELVE TRAILBLAZER ROCKET VEHICLES
Allen B. Henning, Reginald R. Lundstrom, and Jean C. Keating. Apr 64, 84p
N64-18077
OTS $2.25

DESCRIPTORS: *Re-entry vehicles, Flight testing, Wind,

PB-171 809-6
Martin [Marietta Corp.] Denver, Colo.
CRYOGENIC MATERIALS DATA HANDBOOK SUPPLEMENT NO. 6.
Progress rept. no. 14
F. R. Schwartzberg, S. H. Osgood, R. D. Keys, and T. F. Kiefer. 15 Jan 64, 25p
Contract AF33(657)9161
OTS $2.00

DESCRIPTORS: *Cryogenics, Metals, Alloys, Materials, Laminated plastics, *Low temperature research, Mechanical properties, Handbooks, Aluminum alloys, Cobalt alloys, Beryllium alloys, Stainless steel, Copper alloys, Nickel alloys, Titanium alloys, Tungsten alloys, Carbides, Ice, Plastics, Laminated plastics, Glass textiles, Molybdenum alloys, Tensile properties, *Guided missiles, Thermal expansion.

AD-434 821 repriced
Naval Ordnance Lab., White Oak, Md.
ESTIMATION OF HIGH AND LOW PROBABILITY EED FUNCTIONING LEVELS
L. D. Hampton, J. N. Ayres, and I. Kabik. Apr 64, 12p
NOLTR-63-266
OTS $0.50

DESCRIPTORS: *Explosisives initiators, *Electric primers, Electric detonators, Reliability, Probability, Errors, Statistical analysis, Sensitivity, Safety, Mathematical prediction.

Predicting very high or low EED response probabilities usually requires extrapolation from limited data. Extrapolation errors will be increased by inappropriate test plans or statistical treatment. Various test plans are discussed. Possible new prediction techniques are suggested. The necessity for careful design of experiment is stressed. (Author)

in thickness expander disks have been investigated theoretically and experimentally, and are shown to be attributable to higher overtones of the symmetric and asymmetric radial modes of vibration. For diameter to thickness ratios above 20, spurious responses are small and for the most part appear to be independent of diameter. For diameter to thickness ratios less than 20, spurious responses are dependent on diameter and increase in magnitude with decreasing diameter. These spurious responses can be substantially reduced by removing three segments from each disk to form a modified triangle. Two or more separate electrode pairs of limited area, applied to the same ceramic wafer, can be operated as independent resonators with only negligible electrical and/or mechanical intercoupling.

PB-166 015
Electrical Engineering Research Lab., Univ. of Illinois, Urbana.
THE FINITE RANGE WIENER-HOPF INTEGRAL EQUATION AND A BOUNDARY VALUE PROBLEM IN A WAVEGUIDE. Technical rept. no. 42
Raj Mittra. 1 Oct 59, 42p
Contract AF33(616)6079
AD-229 279
OTS $4.60

DESCRIPTORS: *Waveguides, *Integral equations, Theory, *Boundary value problem.

The finite bifurcation problem in a rectangular waveguide is formulated in terms of a finite range Wiener-Hopf integral equation. The solution of this equation is obtained by analytic means. The case when the septum is semi-infinite is also included and a connection between the methods of solution for the finite and the infinite case is provided, the finite case being an extension of the infinite one. The problem of numerically calculating the quantities of interest, viz., the mode coefficients is discussed briefly. The technique presented is general and is applicable to other finite range Wiener-Hopf integral equations for which the kernel can be expanded as a series of exponentials. (Author)

NASA-TN-D-2173
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
EVALUATION OF FILAMENT DETERIORATION IN ELECTRON-BOMBARDMENT ION SOURCES
Nelson L. Milder and William R. Kerslake. May 64, 41p
N64-19483
OTS $1.00

DESCRIPTORS: *Ion sources, *Filaments, Degradation.

AD-272 863
[Polytechnic Inst. of Brooklyn, N. Y.]
FUEL CELL MATERIALS. Quarterly progress rept. no. 3, 1 Mar-31 May 61
Harry P. Gregor, R. M. Danziger, and A. Tejeda. [1961] 27p
Contract DA36-039-sc-85384
OTS $2.60

DESCRIPTORS: *Fuel cells, *Electrolytes, *Membranes, Resistance Electrical), Permeability, Catalysts, Polymers, Plastics, Ion exchange resins, Platinum

An improved cell for measuring the ohmic resistance of fuel cell electrolytes was constructed. A number of new homogeneous anion-permeable membranes of low ohmic resistance were prepared. Platinum black catalyst was incorporated into certain of these which were submitted to the U. S. Army Signal Research and Development Laboratory for further evaluation. (Author) (See also AD-262 528)

PB-166 011
Radio and Electrical Engineering Div., National Research Council of Canada, Ottawa.
BIBLIOGRAPHY OF PUBLICATIONS OF THE RADIO AND ELECTRICAL ENGINEERING DIVISION
J. H. Craven, M.D. Gosselin, and W. L. Haney. Jun 62, 180p
Rept. no. ERB-635
OTS $12.50

DESCRIPTORS: Documentation, *Bibliographies, Indexes, *Electronics, *Electrical engineering, Periodicals,

This bibliography consists of a serial list of journal publications, Division reports (PRA, ERA, PRB, and ERB) and books, an author's index, and a subject index. The serial lists are numbered in the order of appearance in the NRC Review, and contain the author's name, the title of the article, the date and journal in which the paper was published, an abstract reference, and the subject classification. Divisional documents are not usually abstracted. Where the author's abstract is available it has been used, in some instances in an abbreviated form. The serial list of documents includes the subject classification as well. The serial numbers of a particular author's publications may be found by referring to the Author Index, and the publications will be found under those serial numbers. The serial numbers of all the papers which are contained in the bibliography may be located in the Subject Index which is based upon the UDC classification. The Subject Index refers to the papers by the serial numbers of the serial list. Divisional documents are referred to by the Divisional number. The period covered is approximately from the formation of the Division in 1946, and is complete to December 1961. The main index of these publications has been the NRC "Annual Review" and the "Bulletin" published quarterly by this Division. The Review and the Bulletin will provide an index to publications written after December 1961. It is intended to bring this bibliography up-to-date from time to time.

N64-19223
Union Carbide Consumer Products Co., Parma, Ohio.
STUDY PROGRAM TO IMPROVE FUEL CELL PERFORMANCE BY PULSING TECHNIQUES.
Quarterly rept. no. 3, 2 Jan - 31 Mar 64
M. L. Kronenberg. 1 Apr 64, 22p
Contract NAS3-2752
NASA CR-54031
OTS $2.60

DESCRIPTORS: *Fuel cells, Performance (Engineering),

system implication, recommended corrective action, and a chronological indication of the current disposition. These problems were then critically examined to determine what new knowledge could be gained from these operational experiences.

PB-166 030
Stanford Research Inst. [Menlo Park] Calif.
DETECTION TECHNIQUES IN DOPPLER TRACKING SYSTEMS.
Final rept.
John F. Honey. Apr 55, 80p
Contract DA04-200-ORD-278
SRI Proj. 899; AD-68 486
OTS $7.60

DESCRIPTORS: *Doppler systems, *Tracking, Detection, Guided missiles, Signal-to-noise ratio, Radio waves, Propagation, Errors, Velocity, Frequency, Operation, Effectiveness.

The investigation showed that, under the expected field conditions and provided suitable detection techniques are used, the detection errors caused by noise may be made negligible in comparison with errors in field site surveying or errors from unknown variations in the velocity of radio waves. Interfering signals caused by multipath propagation are considered to be a principal problem of detection. An operator probably could best select the desired signal from interfering signals because of the complex information involved. Two data reduction techniques are proposed. In the first system, the operator acts as the detector, and the frequency-vs-time characteristics of an estimate of the signal are adjusted by the operator to approximate those of the received signal in a series of convergent spectographic presentations. The second technique provides visually supervised phase detection of the desired signal. In this case, the operator is presented with a phase-interference pattern of the desired signal with respect to the best estimated signal produced by the spectrographic process.

FOOD, HANDLING, AND PACKAGING EQUIPMENT

TID-18285
Fish and Wildlife Service, Gloucester, Mass.
LOW-LEVEL RADIATION PRESERVATION OF FISHERY PRODUCTS. Rept. for Oct 60-Oct 62.
Joseph W. Slavin, Maynard A. Steinberg, and Thomas J. Connors. Apr 63, 36p
Contract AT(49-11)1889
OTS $1.00

DESCRIPTORS: *Food, *Fishes, Molluscs, Irradiated foods, *Preservation.

TID-19969
Fish and Wildlife Service, Gloucester, Mass.
STUDY OF IRRADIATED-PASTEURIZED FISHERY PRODUCTS. Rept. for 1 Oct 62-30 Sep 63.
Joseph W. Slavin and Louis J. Ronsivalli. 29 Nov 63, 81p
Contract AT(49-11)1889
OTS $2.00

DESCRIPTORS: *Food, *Fishes, Irradiated foods, Pasteurization.

MACHINERY, FABRICATION, AND ACCESSORY EQUIPMENT

Engines and Propulsion Systems

BNL-855(PR-7)
Brookhaven National Lab., Upton, N. Y.
HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW.
A bimonthly technical progress review, Volume 2, no. 1.
Feb 64, 50p PR-7
OTS $1.25

NASA-TN-D-2281
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
RESEARCH ON RESISTANCE-HEATED HYDROGEN THRUSTORS
John R. Jack. Ernie W. Spisz, and Paul F. Brinich, Apr 64, 27p
N64-19293
OTS $0.75

DESCRIPTORS: *Electric propulsion, *Hydrogen, Heat exchangers,

NASA-TN-D-2172
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio
STATUS OF ELECTROSTATIC THRUSTORS FOR SPACE PROPULSION
William R. Mikelsen and Harold R. Kaufman. May 64, 128p
N64-19477
OTS $2.75

DESCRIPTORS: *Space propulsion, *Electric propulsion,

AD-426 852
National Research Council of Canada, Ottawa. Div. of Mechanical Engineering.
AERODYNAMIC PERFORMANCE OF A TRACTION TURBINE SUITABLE FOR A GAS TURBINE LOCOMOTIVE
U. Okapuu. Feb 63, 52p
Mechanical Engineering rept. MT-50; N.R.C. no. 7775; N64-14084
OTS $5.60

DESCRIPTORS: *Gas turbines, Aerodynamic loading, Tests, Torque, Velocity, Operation, Turbines, Locomotives, Performance (Engineering).

A two-stage, low reaction traction turbine suitable for a gas turbine locomotive powerplant was tested under unheated inlet conditions over a range of speeds and pressure ratios. The aerodynamic performance characteristics are presented in some detail. The swallowing capacity and efficiency of the turbine were found to be somewhat below the expected figures. A number of changes are suggested on the strength of test results. (Author)

AD-431 785 repriced
Naval Ordnance Lab., White Oak, Md.
INITIATION OF EXPLOSIVES BY EXPLODING WIRES
Howard S. Leopold. 15 May 63, 24p
NOLTR-63-244
OTS $0.75

DESCRIPTORS: *Explosives initiators, *Firing circuits, *Exploding wires, Platinum, Resistance (Electrical), Capacitors, Explosive materials, *PETN, Detonation, Probability.

The effects of circuit resistance and bridgewire length on the initiation of PETN by exploding 1 mil diameter platinum wires were investigated. A one microfarad capacitor charged to 2000 volts was used as the energy source. Increasing circuit resistance reduces the current density and the energy input to the wire lowering the probability of producing detonation in PETN. The importance of keeping the extraneous circuit resistance to an absolute minimum is shown. (Author) (See also AD-424 518)

PB-166 019
Office of Scientific Research and Development. Div. 4
BOMB, ROCKET, AND TORPEDO TOSSING. Summary technical rept. vol. 2
A.V. Astin, ed. 1946, declassified 27 Oct 60, 213p
Contract OEMsr-1131
OTS $14.50

DESCRIPTORS: *Military tactics, *Toss bombing, Bombing, Ordnance, *Rocket tossing, *Torpedo attack, Aircraft equipment, Design, Feasibility studies

This volume covers work done on the development and evaluation of equipment for tossing bombs, rockets, and torpedoes. A simplified theory of the toss technique is given including the principle of instrumentation. A description of the equipment designed and produced is given. Considerable space is devoted to describing the early experimental models, which are now obsolete. These descriptions are included primarily because almost all of the evaluation studies which were made on the equipment were carried out with experimental models. The problems of installation and maintenance of the equipment in aircraft under Service conditions are presented. A summary of the evaluation tests on bomb, rocket, and torpedo tossing is given. The theoretical formulation of the toss technique is presented in some detail. The newest ideas for tossing equipment, some of which have not reached the stage of development where they could be evaluated by field tests, are include.

PB-166 016
Office of Scientific Research and Development. Div. 2
EFFECTS OF IMPACT AND EXPLOSION. Summary technical rept. vol. 1
Merit P. White, ed. 1946, declassified 27 Oct 60, 512p
Contract OEMsr-1131
OTS $26.00

DESCRIPTORS: *Ordnance, *Explosion effects, Underwater explosions, Underground explosions, *Terminal ballistics, Shelters, Target descrimination, Weapons, Operations research, Training.

Contents:
Underwater explosives and explosions
Explosions and explosives in air
Explosions in earth
Muzzle blast, its characteristics, effects and control
Fundamentals of terminal ballistics
Terminal ballistics of armor
Terminal ballistics of concrete
Terminal ballistics of plastic protection
Terminal ballistics of soil
The frangible bullet for use in Aerial Gunnery Training
Design of model supersonic wing tunnel
Behavior of materials under dynamic loads
Deformation of steel under high pressure by
Defense against shaped charges
Structural protection
Target analysis and weapon selection
Technical library
Training of operation analysts
Weapon data sheets

PB-166 017
Office of Scientific Research and Development. Div. 3
ROCKET AND UNDERWATER ORDNANCE. Summary technical rept. vol. 1
Eliot B. Bradford, ed. 1946, declassified 27 Oct 60, 397p
Contract OEMsr-1131
OTS $21.00

DESCRIPTORS: Rocket research, *Rockets, *Underwater ordnance, Rocket propellants, Weapons, Engineering, *Ordnance, Test facilities.

This report describes briefly the unprecedented facilities developed at Morris Dam (near Pasadena) for full-scale studies of the behavior of aircraft torpedoes and other underwater ordnance items on entry into water at extreme speeds and angles. Most of the principles and practices employed in the development of nearly all the rockets used by United States forces in World War II combat, and of several others not so used are summarized. In all these rockets smokeless powders were used.

AD-418 644
Rocketdyne, Canoga Park, Calif.
MISSILE SYSTEM SAFETY: AN EVALUATION OF SYSTEM TEST DATA (ATLAS MA-3 ENGINE SYSTEM). Rept. on Human Factors Personnel Subsystems
George A. Peters and Frank S. Hall. 1 Mar 63, 309p
Contract AF04(694)8
Rept. no. R-5135; ROM 3181-1001; N63-15902
OTS $19.75

DESCRIPTORS: *Guided missiles (Surface-to-surface), *Safety, Guided missile components, Guided missile safety, Rocket motors, Guided missile personnel, Human engineering, Job analysis, Reliability, *Rocket motors (Liquid propellant).

A review was made of all of the human factors incidents and problems that have affected the operational safety of the Atlas engine system. The information concerning each problem was updated, further analyses were made, supporting data were obtained, and a case study format was prepared. Each case study contains statements regarding the equipment affected, job operation involved, problem criticality, problem type,

Fuels, Lubricants, and Hydraulic Fluids

PB-166 029
Allegany Ballistics Lab., Hercules Powder Co., Cumberland, Md.
HAZARDS EVALUATION OF THE CAST DOUBLE-BASE MANUFACTURING PROCESS
R. H. Richardson. Dec 60, 65p
Contract NOrd-16640
Rept. no. ABL/X-47; AD-250 858
OTS $6.60

Presented at the 16th JANAF Solid Propellant Group Meeting held in Dallas, Texas, June 14-16, 1960.

DESCRIPTORS: *Solid rocket propellants, *Hazards, Handling, Transportation, Storage, Combustion, Temperature, Casting, Manufacturing methods, Explosions, Detonations

In early 1958, a program was begun using the Application Method to assess the hazards inherent in the case propellant process. The purpose of this program was to ensure safety during the manufacture, handling and storage of solid propellant products. A disquisition of both the Relative and Application Methods of acquiring and applying sensitivity data is presented. The applicability, purposes, shortcomings, and environmental factors influencing existing sensitivity tests are discussed. Also, presented is the application of sensitivity tests and results of the investigation of the hazards involved with the introduction of ammonium perchlorate into the cast propellant process, on the basis of these investigations the following have been concluded: The Application Method of hazards assessment is more realistic, reliable, and applicable than the previously used Relative Method. (Author)

PB-166 027
Materials Lab., [Aeronautical Systems Div.], Wright-Patterson AFB, Ohio.
THE USE OF INFRARED AND EMISSION SPECTROSCOPY IN THE IDENTIFICATION OF AIRCRAFT GREASES
Freeman F. Bentley, James A. Reamer, and Eugene F. Wolfarth. Jul 55, 34p
WADC Technical note 55-311
OTS $3.60

DESCRIPTORS: *Greases, Lubrication, *Airplane engine oils, Aircraft, Air Force, Armed forces supplies, *Infrared spectroscopy, Emissivity, Identification.

Infrared spectra and emission data on all the available Air Force specification greases and several foreign greases are compiled in this report. This investigation demonstrates that small samples of hydrocarbon oil, ester, or silicone oil based greases can be readily identified by infrared and emission techniques. The variation of ingredients in greases produced by various manufacturers qualified under the same specification number points to the need of obtaining compositional data on various greases within the same specification. (Author)

AD-414 730
National Research Council of Canada, Ottawa. Div. of Mechanical Engineering.
EXPERIMENTS ON IGNITION OF BIPROPELLANTS UNDER VACUUM CONDITIONS . I. ON PYROTECHNIC IGNITION OF ETHYL ALCOHOL AND LIQUID OXYGEN
R. Sandri and R. Billingham. May 63, 29p
Mechanical Engineering rept. MP-27; N.R.C. 7458
OTS $2.60

DESCRIPTORS: *Liquid rocket propellants, Hypergolic rocket propellants, *Bipropellants, *Ethanols, *Liquefied gases, Oxygen, Ignition, *Rocket igniters, Pyrotechnics, Vacuum systems, Combustion gases.

A series of experiments were carried out with three different types of pyrotechnic igniters. These igniters were installed in a small uncooled combustion chamber which was mounted on top of a 580 cu. ft. tank which could be evacuated. First, the igniters were fired without propellants both in vacuum and at atmospheric pressure. The pressure produced by the igniter powder gases inside the combustion chamber was measured as a function of time. After that, the igniters were used for the ignition of alcohol and liquid oxygen. These propellants were injected into the combustion chamber under varying conditions which were controlled by an automatic timing device. In this case, propellant rates of flow, injection pressures, combustion chamber pressure and pressure build-up in the vacuum tank during firing were recorded and measured. It was possible to obtain detailed information on the conditions required for satisfactory ignition and on the transient phenomena preceding and following it, as well as on the behaviour of the components of the liquid propellant injection system. (Author)

AD-280 640
National Research Council of Canada, Ottawa. Div. of Mechanical Engineering.
A QUANTITATIVE METHOD FOR THE ANALYSIS OF SOLVENT AND BASE LUBRICANT CONTENTS OF AUTOMOTIVE HYDRAULIC BRAKE FLUIDS
R. Brisebois and L. Gardner. Jan 62, 23p
Mechanical Engineering rept. MP-23; N.R.C. no. 6758
OTS $2.60

DESCRIPTORS: Hydraulic fluids, *Hydraulic brakes, *Lubricants, *Solvents, Quantitative analysis, Chromatographic analysis

A method is presented for the quantitative determination of the solvent components and base lubricant content of automotive hydraulic brake fluids. A gas chromatographic procedure is used to determine the various solvents present, the base lubricant content then being obtained by difference from 100 percent. (Author)

PB-166 022
Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
RESULTS OF TURNING AND BACKING TESTS OF A SELF-PROPELLED 1/6.418-SCALE MODEL OF THE DRAKE (XM-157). Jul 58, 8p
Contract DA30-069-ORD-1763
Rept. no. 710
OTS $1.10

DESCRIPTORS: *Amphibious vehicles, Maneuverability, Tests, Velocity.

PB-166 012
National Research Council of Canada, Ottawa. Div. of Mechanical Engineering.
AN HYDRAULICALLY OPERATED GATE FOR SNOW-PLOWS
M. S. Kuhring. Feb 63, 26p
Mechanical Engineering rept. ME-213; N.R.C. no. 7328
OTS $2.60

DESCRIPTORS: *Snow vehicles, *Snow removal, Maintenance vehicles, Hydraulic systems,

The report describes work done with an hydraulically operated gate to prevent snow from snowplow blades from blocking cross streets, private driveways and fire hydrants. The gate worked satisfactorily in heavy snow. (Author)

PB-166 036
Sharp (George G.) Inc., New York
CARGO HANDLING STUDY.
Nov 63, 162p
Contract MA-3019
V5257
OTS $12.00

DESCRIPTORS: *Shipping, *Cargo, Handling, Costs, *Hoists, *Trucks, Trailers, *Conveyors, *Storage, Ship decks, Ship structural components.

The primary objective of the study is to review, analyze, and evaluate the existing cargo handling techniques and equipment used on American and foreign ships, and to identify areas of deficiencies and to point out possible improvements over existing cargo handling systems. The scope of the study covers cargo handling rigs, cranes, individual system components such as unit handling equipment, conveyors, elevators, and miscellaneous components associated with cargo handling and stowage.

AD-420 569
Materiadyne Div., Pfaudler Permutit, Inc., Alfred Station, N. Y.
RESEARCH ON THE THERMAL PROPERTIES OF ZIRCONIA. Final technical rept. on Bonding in Metal Ceramic, Ceramic and Intermetallic Systems.
R. B. Burdick and W. R. Hoskyns. Sep 63, 33p
Contract AF33(616)8208
ARL-63-170; N63-23105
OTS $2.25

DESCRIPTORS: *Zirconium compounds, *Oxides, *Refractory materials, Elasticity, Thermal expansion, Thermal diffusion, Shear stresses, Thermal properties, Additives, Magnesium compounds, Aluminum compounds, Cerium compounds, Calcium compounds, Titanium, Zirconium.

Thermal expansion, thermal diffusivity and elasticity measurements, over a range of temperatures, were made for zirconia bodies modified by additions of MgO, Al_2O_3, CeO_2, CaO, Ti, and Zr. The effects of the additives on these thermal properties of zirconia were demonstrated. Specimens of unstabilized monoclinic zirconia were prepared by hot pressing. The elastic moduli of these specimens were measured by a sonic method in the temperature range 25 to 1000C. Application of mathematical expressions developed for the porosity dependence of elastic modulus of refractory oxides led to the calculation of Young's and shear moduli at zero porosity of this material in the specified temperature range. (Author)

AD-277 791
McDonnell Aircraft Corp., St. Louis, Mo.
UNPUBLISHED MATERIALS RESEARCH AND DEVELOPMENT PROGRAMS. Semiannual summary rept. no. 1. 10 Jul 62, 90p
Contracts AF33(657)7749 and BPSN2(8-7381)73812
Rept. no. 8939
OTS $8.10

DESCRIPTORS: *Metals, Steel, Titanium alloys, Cobalt alloys, Nickel alloys, Stainless steel, Refractory metals, *Materials, *Plastics, Plating, *Finishes and finishing, *Lubricants, *Electroforming, Mechanical properties, Chemical properties, Physical properties, Tests.

Fifty current test programs have been reviewed, summarized, and index coded for content. The test programs submitted can be categorically grouped as follows: mechanical, physical, chemical and miscellaneous properties of the light metals, low and ultra high strength steels, austenitic stainless steels, nickel chromium steels, titanium alloys, cobalt base alloys, nickel base alloys, and refractory metals; mechanical, physical and miscellaneous properties of plastic materials, such as acrylics, epoxys, phenolics, polyesters, urethanes and vinyls; effects of plating on the fatigue strength of 4340 steel; chemical and miscellaneous properties of organic finishes, inorganic finishes, surface conditioning treatments and chemical finishes when exposed to a corrosive environment and/or elevated temperature; effects of inorganic finishes on the mechanical, physical and chemical properties of refractory metals; chemical and miscellaneous properties of lubricants; and mechanical, physical and chemical properties of nickel and copper electroformed parts.

The subject of probability state variable systems is examined from two points of view. The first point of view is that of automata theory and the problems of automaton environment interaction is discussed. Second, a detailed structural model of a generalized switching device is formulated and the major problems of interest in the theory of monotype probability state variable systems are described. Novel mathematical methods for determining properties of the probability state variable device are developed. An index notation for logic problems is presented and some of the general properties of switching networks are analyzed using this notation. (Author) (See also AD-428 099)

IS-833
Ames Lab., Iowa State Univ. of Science and Tech.
FORTRAN PROGRAMS FOR THERMAL DIFFUSIVITY CALCULATIONS
Arthur H. Klein. Feb 64, 20p
Contract W7405-eng-82
OTS $0.50

ANL-6654
Argonne National Lab., Ill.
A METHOD OF CALCULATING TRANSIENT TEMPERATURES IN A MULTIREGION, AXISYMMETRIC, CYLINDRICAL CONFIGURATION. THE ARGUS PROGRAM, 1089/RE248, WRITTEN IN FORTRAN II.
D. F. Schoeberle, J. Heestand, and L. B. Miller.
Nov 63, 119p
Contract W31-109-eng-38
OTS $2.50

NAA-SR-9190
Atomics International, Canoga Park, Calif.
THE SNAPKIN VI COMPUTER PROGRAM FOR SNAP REACTOR KINETICS CALCULATIONS
W. A. Rhoades. [15 Apr 64] 107p
Contract AT(11-1)GEN-8
OTS $2.25

WAPD-TM-377
Bettis Atomic Power Lab., Pittsburgh, Pa.
EQUATIONS AND PROGRAMS FOR SOLUTIONS OF THE NEUTRON GROUP DIFFUSION EQUATIONS BY SYNTHESIS APPROXIMATIONS. Interim memo.
S. Kaplan, O. J. Marlowe, and W. R. Cadwell. Dec 63, 81p
Contract AT(11-1)GEN-14
OTS $1.75

DESCRIPTORS: Neutrons, *Neutron transport theory, Integral equations, *Programming

WAPD-TM-407
Bettis Atomic Power Lab., Pittsburgh, Pa.
RECAP-1. A MONTE CARLO PROGRAM FOR ESTIMATING EPITHERMAL CAPTURE RATES IN SLABS. Interim memo.
N. R. Candelore and R. C. Gast. Oct 63, 38p
Contract AT(11-1)GEN-14
OTS $1.00

DESCRIPTORS: *Neutrons, *Programming (Computers), *Monte Carlo method.

WAPD-TM-398
Bettis Atomic Power Lab., Pittsburgh, Pa.
SEAL-SHELL-2. A COMPUTER PROGRAM FOR THE STRESS ANALYSIS OF A THICK SHELL OF REV--OLUTION WITH AXISYMMETRIC PRESSURES, TEMPERATURES, AND DISTRIBUTED LOADS
C. M. Friedrich. Dec 63, 65p
Contract AT(11-1)GEN-14
OTS $1.50

DESCRIPTORS: *Programming (Computers), *Stresses, Mathematical analysis

HASL-141
Health and Safety Lab., Atomic Energy Commission, New York.
PRESELECT ADDRESS UNIT FOR THE IBM 1620 COMPUTER
J. J. Frey, R. T. Graveson, and M. E. Cassidy. Dec 63, 12p
OTS $0.50

PB-165 968
Institute of Science and Tech., Univ. of Michigan, Ann Arbor.
A DIGITAL COMPUTER PROGRAM FOR ANALYZING SEDIMENTATION EQUILIBRIUM DATA
Gordon L. Nordby and J. L. Oncley. Jan 64, 45p
Grants NIH-H-2127 and HE-07696-01
Biophysics Research repts. no. 1
OTS $4.60

DESCRIPTORS: *Programming (Computers), Chemical equilibrium, Proteins, Colloids, Solutions, Molecular properties, Seperation, Centrifuges, *Biophysics, *Statistical analysis.

This program analyzes Rayleigh interference fringe patterns obtained either de facto from suitable equilibrium sedimentation experiments or de novo from a suitable fringe pattern simulator (PB-165 969. In the analysis, both a solute molecular weight and, in effect, a solute activity coefficient are adduced concomitantly from the fringe pattern data. The equation upon which the analysis is based emerges from a general force equation descriptive of the state of equilibrium in a sedimentation-diffusion context. The analysis performed by this program is a multivariate linear regression analysis which uses an equation derived rather directly from the system model equation. This program constitutes a set of instructions by means of which an IBM 7090 computer analyzes data from suitable equilibrium sedimentation experiments.

PB-165 969
Institute of Science and Tech., Univ. of Michigan, Ann Arbor.
A DIGITAL COMPUTER PROGRAM FOR SIMULATING SEDIMENTATION EQUILIBRIUM DATA
Gordon L. Nordby and J. L. Oncley. Jan 64, 36p
Grants NIH H-2127 and HE-07969-01
Biophysics Research repts. no. 2
OTS $3.60

DESCRIPTORS: *Programming (Computers), *Biophysics, Statistical analysis, *Simulation, Chemical equilibrium, Solutions.

Plastics

OTS SB-524
Office of Technical Services, Dept. of Commerce, Washington, D. C.
EXPANDED PLASTICS. Nov 63, 12p
OTS Selective Bibliography SB-524
OTS $0.10

DESCRIPTORS: *Bibliographies, Plastics, *Expanded plastics, Foam rubber, Packaging materials, Heat-resistant plastics, Sandwich construction, Underwater, Adhesion.

Lists 175 reports and translations on foaming-in-place resins, latex foam packing materials, heat resistant core materials for sandwich construction, rigid urethane foams, resilient and flexible plastic foams, underwater adhesion of foams, medical uses of foamed plastics among other subjects.

SC-R-64-124
Sandia Corp., Albuquerque, N. Mex.
THE EFFECT OF RADIATION ON THE MECHANICAL PROPERTIES OF POLYMERS, UNCLASSIFIED LITERATURE 1955 TO OCTOBER, 1963
R. K. Traeger. Mar 64, 36p
OTS $0.75

MATHEMATICS

PB-165 966
Electrical Engineering Research Lab., Univ. of Illinois, Urbana.
ON THE SOLUTION OF A CLASS OF WIENER-HOPF INTEGRAL EQUATIONS IN FINITE AND INFINITE RANGES. Technical rept. no. 37
Raj Mittra. 15 May 59, 52p
Contract AF33(616)6079
AD-220 543
OTS $5.60

DESCRIPTORS: *Integral equations, Integral transforms, Matrix algebra, *Communication theory, Electromagnetic waves, Propagation, Simultaneous equations, Numerical analysis,

An investigation is presented of the Wiener-Hopf integral equation $g(t) = \int_0^T f(\tau)\, K|t-\tau|\, d\tau$ for a T either finite or infinite. The assumption is made that $K|t|$ admits of an expression of the form $K|t| \Sigma C_m e^{-k_r|t|}$. The method of solution for the semi-infinite range ($T = \infty$) is discussed and then extended to T finite. Two basically different approaches are used; the first leads to a set of simultaneous equations which can be solved by analytic means, and the second uses the technique of Fourier transforms in a complex plane and is more suitable for an iterative method of solution for the finite T case (for $T = \infty$, the Wiener-Hopf technique yields the answer directly). The eigenvalue problem corresponding to the above kernel is also discussed. Suitable numerical examples are included and certain applications in the fields of information theory and electromagnetic wave propagation are also pointed out. (Author)

LA-3007
Los Alamos Scientific Lab., N. Mex.
AN UNCONDITIONALLY STABLE IMPLICIT DIFFERENCE SCHEME FOR THE HYDRODYNAMICAL EQUATIONS
James Turner and Burton Wendroff. 1 Oct 63, 45p
Contract W7405-eng-36
OTS $0.75

N64-18424
Queensland Univ., Brisbane (Australia).
AN INFINITE CLASS OF PERIODIC SOLUTIONS OF $\ddot{x}+2x^3=p(t)$
G. R. Morris. [1958] 14p
Contracts NASw-845; AF49(638)1242 and Nonr-3693(00)
NASA-CR-53562
OTS $1.60

DESCRIPTORS: *Oscillation, Topology, *Nonlinear differential equations.

PB-165 970
Stanford Univ., Calif. School of Humanities and Sciences.
NUMERICAL SOLUTION OF BOUNDARY-VALUE PROBLEMS BY THE METHOD OF INTEGRAL OPERATORS. Technical rept. CS 4
Stefan Bergman and John G. Herriot. 28 Feb 64, 35p
OTS $3.60

DESCRIPTORS: *Boundary value problems, *Numerical methods and procedures, Integrals, *Operators (Mathematics), Partial differential equations, Programming (Computers)

Linear partial differential equations of the form $L(\tilde{U}) \equiv \tilde{U}_{xx} + U_{yy} + c\tilde{U} = 0 \quad c \not\equiv 0$ in two real variables x and y where c is a real polynomial in x and y are considered. A solution $\tilde{U}$ of the above equation in a simply connected bounded domain D which assumes prescribed values on the boundary C of the domain D was sought. Assuming that the boundary C is a closed curve which is a sum of a finite number of analytic curve segments, and that for this domain D the above equation has no eigenvalues; this is ensured if, for example, c is negative throughout D.

Computing Devices

AD-428 087 repriced
Adaptronics, Inc., Alexandria, Va.
THEORY OF PROBABILITY STATE VARIABLE SYSTEMS. VOLUME III: MONOTYPE SYSTEM THEORY AND CONSIDERATIONS FROM AUTOMATA THEORY. Final rept., 15 Oct 61-14 Oct 62
L. O. Gilstrap, Jr., M. J. Pedelty, and R. J. Lee. Dec 63, 150p
Contract AF33(657)7100
ASD-TDR-63-664, Volume III
OTS $2.75

DESCRIPTORS: *Automata, Theory, *Cybernetics, Pattern recognition, Redundant components, *Communication theory, Control systems, Stability, *Decision making, *Artificial intelligence, Learning, *Computer logic, *Switching circuits, Feedback,

appreciably; the loading on the back side built up somewhat more rapidly than predicted for a two-dimensional cylinder. (Author)

AD-279 325
Institute [for Aerospace Studies] Univ. of Toronto (Canada)
ANALYSIS OF THE PERFORMANCE OF THE UTIA RANDOM LOAD FATIGUE FACILITY
J. B. Carr. Oct 61, 47p
Contract AF49(638)548
UTIA Technical note no. 54; AFOSR-1865
OTS $4.60

DESCRIPTORS: *Test facilities, * Loading (Mechanics), *Fatigue (Mechanics), Statistical functions, Test equipment, Analog systems, Design, Analysis.

An analysis of the performance of the UTIA random load fatigue facility is presented. Mobility analogue techniques are utilised to predict the frequency response of the load output to the test specimen for either a constant amplitude current or a constance amplitude voltage input to a basically electro-mechanical system. The use of these theroretical frequency response functions to predict the load capability and the nature of the random stress output is demonstrated. Experimental results from two different mechanical configurations of the machine are compared with the predicted results and good agreement is obtained. (Author)

AD-428 856 repriced
Naval Ordnance Lab., White Oak, Md.
DESIGN METHOD FOR DOUBLE-WALLED EXTERNAL PRESSURE VESSELS
M. V. Churchill. Feb 64, 42p
Rept. no. NOLTR 63-249
OTS $1.25

DESCRIPTORS: *Pressure vessels, Design, *Structural shells, Stiffened cylinders, Equations, Stresses, Aspect ratio, Stability, Elasticity, Optimization, Loading (Mechanics), Elastic shells, Beams (Structural), Submarine hulls.

By pursuing the analogy which exists between the reinforced pressure vessel and the beam on an elastic foundation, and by systematic application of the principle of balanced design, a set of equations is derived by which optimum values for wall thickness. Reinforcement size and spacing can be calculated directly from the shell radius, the design pressure, and the mechanical properties of the material. The element of trial and error is virtually eliminated and the use of iterative methods is restricted to a few cases in which convergence is quite rapid. The effect of rigid end bulkheads is discussed and a means of minimizing secondary stresses from that source is proposed. A sample calculation is given and a comparison made with designs produced by other methods. (Author)

AD-428 843 repriced
Naval Ordnance Lab., White Oak, Md.
ELASTIC WAVE DECAY II
Paul Harris. Feb 64, 27p
Rept. no. NOLTR 63-219; N64-15520
OTS $0.75

DESCRIPTORS: *Shock waves, Propagation, Elasticity, Stresses, Crystals, Solids, Attenuation, Materials, Harmonic analysis, Relaxation time, Partial differential equations, Deformation, Nonlinear systems.

A time dependent non-linear formulation of shock propagation in an originally isotropic medium is presented. It is postulated that such a formulation accounts for the known non-linearity of the dissipative mechanisms which result in the decay of elastic waves in crystalline solids. By combining this non-linear theory with the appropriate conservation equations, characteristics and characteristic equation are derived which explicitly contain dispersion and decay in terms of unknown functions of the solid medium in question. By applying theory and experimental data available from ultrasonics the functions of importance to the linear region are found. The growth and decay of the amplitudes associated with the first non-linear contributions are traced by seeking solutions of a non-linear wave equation and applying appropriate boundary conditions. (Author)
(See also AD-419 842)

Aerodynamics and Pneumatics

AD-279 634
Institute [for Aerospace Studies] Univ. of Toronto (Canada)
AN INVESTIGATION OF THE FLUCTUATING FORCES ACTING ON A STATIONARY CIRCULAR CYLINDER IN A SUBSONIC STREAM, AND OF THE ASSOCIATED SOUND FIELD
R. T. Keefe. Sep 61, 112p
Contract AF49(638)249
UTIA rept. no. 76; AFOSR-2147; N62-10771
OTS $9.60

DESCRIPTORS: *Cylindrical bodies, *Subsonic flow, *Acoustics, Wind tunnels, Test methods, Theory, Noise, Experimental data

An experimental investigation was made of the fluctuating forces acting on a short segment of a 1 1/8" diameter stationary circular cylinder placed in the UTIA subsonic wind tunnel. The fluctuating lift was measured over a range of Reynolds numbers from 5000 to 100,000 and the fluctuating drag over a range of 20,000 to 100,000. A large increase in the lift coefficient occurred when two circular disks were fastened to the cylinder in close proximity to the force transducer. The measurements of the acoustic radiation from cylinders placed in a subsonic air jet showed great sensitivity to the cylinder end conditions. Experiments were performed to arrive at an understanding of the end effects, with limited success. A comparison of a theoretical estimate of the acoustic radiation using the results of the force measurements presented herein an correlation data obtained previously at UTIA shows good agreement with the acoustic measurements on one of the configurations tested, and with those of other researchers using a whirling arm apparatus. (Author)

This program causes fringe position data for equilibrium sedimentation interference optics models to be computed. The data, which has the form of fringe number (J) and fringe position (R) sets, simulates that obtained from appropriate sedimentation equilibrium experiments. Data conforming to certain models of solute behavior is generated. This program constitutes a set of instructions by means of which an IBM 7090 computer simulates data obtained from suitable equilibrium sedimentation experiments.

LA-3043
Los Alamos Scientific Lab., N. Mex.
AN INTEGRATED SERIES OF CRYSTALLOGRAPHIC COMPUTER PROGRAMS. II. PROCESSING COLLECTED INTENSITY DATA
Allen C. Larson, Don T. Cromer, and R. B. Roof, Jr.
Jan 64, 61p
Contract W7405-eng-36
OTS $1.50

AD-425 027
Rand Corp., Santa Monica, Calif.
HOW TO BUILD AND ANALYZE DECISION TABLES
Solomon L. Pollack. Nov 63, 18p
P-2829
OTS $1.60

Presented at the Air Defense Command Automation Symposium, Colorado Springs, 12 Nov 63

DESCRIPTORS: *Tables, *Management engineering, *Operations research, Design, *Decision theory, Automation, *Data processing systems, Analysis,

Decision tables, a framework for describing a set of related decision rules, can improve the communication and documentation achievable by previous techniques such as flow charting and narrative descriptions of data processing problems, particularly those containing many complex decision rules. In addition, decision tables offer system analysts the potential to eliminate inconsistencies and redundencies in each set of specified decision rules and to produce computer programs that are efficient in the use of computer storage and computer running time. Decision tables also enable the system analyst to determine if he has considered all of the possible decision rules that can be formed from a particular set of conditions. The conversion of system applications to decision tables, a process which entails making decisions on how large the individual tables should be and what system parameters should be included is described. The technique for reducing the number of written decision rules is also described. Once decision tables are written, they should be checked for completeness and consistency This paper will describe and illustrate the rules that enable system analysts to insure the following: (1) that all possible combinations of conditions for the problem have been considered, (2) that the system does not prescribe different actions for the same situation, and (3) that the system describes each situation and its actions once only. (Author)

PB-166 038
Douglas Aircraft Co., Inc., Santa Monica, Calif.
A MATRIX METHOD FOR THE BUCKLING OF STRUCTURAL PANELS SUBJECTED TO CREEP ENVIRONMENTS.
Final rept., Jul 6-1Jun 62, on Structural Analysis Methods
D. S. Warren, Nov 62, 195p
Contract AF33(616)8359,
Rept. no. LB-31023; ASD-TDR-62-740
OTS $13.50

DESCRIPTORS: *Panels (Structural), Structural parts, Creep, *Buckling (Mechanics), Analysis, *Matrix algebra, Programming (Computers), Digital computers, Sandwich panels.

A method for the analysis of the buckling of plane structural panels subjected to creep environments is presented and evaluated. The method is written matrically for simplified programming for a modern digital computer installation. A suitable sequence of computer operations is described in detail. The sequence of computer operations includes automatic iteration to provide for geometric nonlinearity, and an incremental approach to account for plastic deformation. Initial eccentricity is included explicitly and the limiting case of a structure without eccentricity can be investigated by an eigenvalue definition available at an early stage of the computing process. Test-theory comparisons are presented for a series of structural panels subjected to eccentric, in-plane, compressive loading and elevated temperatures. It is concluded that the method is economically practical and theoretically sound. (Author)

PB-166 007
[IIT Research Inst., Chicago, Ill.]
TESTS ON THE LOADING OF HORIZONTAL CYLINDRICAL SHAPES. Rept. for Mar-Jun 53, on Operation Upshot-Knot-hole
Eugene Sevin. Oct 55, declassified 17 Jan 62, 109p
Contract AF33(038)30029
Rept. no. WT-722
OTS $9.10

DESCRIPTORS: *Nuclear explosion damage, *Blast, Shock waves, *Structural shells, *Cylindrical bodies, *Tanks (Containers) Explosion effects, Pressure, Strain (Mechanics), Loading (Mechanics).

The general objective of the test was to increase the knowledge of blast loadings on structures of cylindrical shape. The specific objectives were to determine the effect of (1) shock strength, (2) size (i.e., scaling), (3) ground proximity, and (4) three-dimensionality. Five horizontal cylinders of various size and distance above ground were situated in the Mach region of two shots. Instrumentation consisted of pressure gages and strain gages, the latter representing the output of a net force measurement system. Most of the test objectives could not be realized. The pressure-time distribution was obtained on a cylinder one radius above the ground. The results indicate the build up and clearing times to be essentially the same as for a cylinder in free space, except for a somewhat longer clearing time on the front face. The analysis of pressure gage data obtained from a vertical cylindrical storage tank indicates that the finite size of the tank did not affect the front face loading

AD-280 529
National Aeronautical Establishment, Ottawa (Canada).
A NOTE ON THE HYPERSONIC FLOW PAST FLAT-FACED AXISYMMETRIC BODIES
S. B. Berndt. Oct 61, 16p
Aeronautical rept. LR-327; N.R.C. no. 6709
OTS $1.60

DESCRIPTORS: *Hypersonic flow, Stagnation point, Velocity, Vortices, Shock waves, *Blunt bodies, Heat transfer.

The velocity gradient at the stagnation point of a flat-faced body is difficult to measure as well as to compute, and there are few accurate data available. Based on the constant-density approximation semi-empirical formulae are established, which give the velocity gradient and the vorticity at the stagnation point in terms of the stand-off distance of the shock, a quantity that can easily be measured. Comparison with accurate theoretical and experimental data shows good agreement. (Author)

AD-413 829
National Aeronautical Establishment, Ottawa (Canada).
SOME NUMERICAL SOLUTIONS FOR THE VISCOUS CORE OF AN IRROTATIONAL VORTEX
I. S. Gartshore. Jun 63, 36p
Aeronautical rept. LR-378; N.R.C. no. 7479
OTS $3.60

DESCRIPTORS: *Vortices, Numerical analysis, *Laminar flow, Wake, Viscosity, Polynomials, Momentum, Velocity, Incompressible flow, Motion, Partial differential equations, Integrals,

A swirling viscous laminar wake imbedded in an irrotational vortex was examined, using momentum integral methods. Fourth degree polynomials were used to approximate the tangential and axial velocity distributions in the wake. Numerical solutions were found for various values of initial core swirl and free stream swirl, although continuous solutions could not be obtained for all combinations of these parameters. Further work is necessary to determine the reason for the singularities which appear in certain solutions. (Author)

AD-417 969
National Aeronautical Establishment, Ottawa (Canada).
THE STATIC AND FORWARD SPEED TESTING OF A FLAPPED WING WITH BOUNDARY LAYER CONTROL FOR USE IN DEFLECTING PROPELLER SLIPSTREAMS DOWNWARD FOR VERTICAL TAKE-OFF. PART II: TESTS AT INCIDENCE AND GROUND PROXIMITY EFFECTS
B. Neal. Jul 63, 98p
Aeronautical rept. LR-383; N.R.C. no. 7558
OTS $8.60

DESCRITPORS: *Verticle take-off planes, *Wings, Split flaps, Flags, Guide vanes, Deflection, Experimental data, Model tests, Boundary layer, Thrust, Ground effects, Performance (Engineering), Theory,

Results from tests at incidence and in the region of ground effect are presented for a large scale, four-propeller, flapped, VTOL aircraft wing model using the mobile test rig developed at this laboratory. Data are presented for two flap configurations with various amounts of flowing boundary layer control for values of the thrust coefficient T_c" from 0.6 to 1.0. A comparison of ground proximity effects over a fixed and moving ground was made and a theory was used to predict successfully the effect of ground proximity on the thrust recovery factor and the slipstream turning angle. (Author)

AD-423 662
National Aeronautical Establishment, Ottawa (Canada)
A WATER TUNNEL INVESTIGATION OF THE FLOW SEPARATION ABOUT CIRCULAR CONES AT INCIDENCE
W. J. Rainbird, R. S. Crabbe, and L. S. Jurewicz. Sep 63, 59p
Aeronautical rept. LR-385; N.R.C. 7633; N64-14067
OTS $5.60

DESCRIPTORS: *Flow visualization, Conical bodies, Laminar boundary layer, Vortices, Momentum, Water tunnels, Fluid flow, *Three-dimensional flow, Separation.

Flow visualisation measurements, using fluorescent dye filaments, have been made on two right circular cones of semi-apex angles 7-1/2° and 12-1/2°, at incidences up to about 40°. During tests the flow within boundary layers, separated vortex sheets and vortex cores was laminar. Details of the flow at small, moderate and large incidence (relative to semi-apex angle) have been elucidated and comparisons have been made with some previously unpublished wind tunnel experiments. The angular positions of all separation and attachment lines, and the directions of the "surface" streamlines, between such lines, have been measured and compared with theory using Cook's method. The position, size and strength of the primary, secondary and tertiary vortices formed from the separated boundary layers, and the distribution of streamline helix angle within the viscous core of the primary vortex, have been determined from photographs of the flow. (Author)

AD-280 874
National Research Council of Canada, Ottawa. Div. of Mechanical Engineering
COMPRESSIBLE GAS FLOW TABLES FOR SPECIFIC HEAT RATIO (γ) = 4/3 (MACH NUMBER 0.000 TO 2.000)
R W. Bassett and M. S. Chappell. Jan 62, 47p
Aeronautical rept. LR-324; N.R.C. no. 6769
OTS $4.60

DESCRIPTORS: *Gas flow, *Compressible flow, *Tables, Specific heat,

The isentropic ratios usually used in compressible gas flow calculations are tabulated for a specific heat ratio (γ) of 4/3 and Mach numbers ranging from 0.000 to 2,000 in increments of 0.001. The values tabulated include: pressure ratio, temperature ratio, area ratio, non-dimensional mass flow with respect to total pressure, non-dimensional mass flow with respect to static pressure, and velocity divided by the square root of the total temperature. (Author)

AD-433 613
Institute for Aerospace Studies, Univ. of Toronto (Canada).
A STATE-OF-THE-ART SURVEY OF SOME ASPECTS OF THE MECHANICS OF RAREFIED GASES AND PLASMAS. Final rept. on Research on Aerodynamic Flow Fields
G. N. Patterson. Mar 64, 235p
Contract AF33(616)6990
UTIAS Review no. 18
OTS $15.50

DESCRIPTORS: *Superaerodynamics, *Plasma physics, Reviews, Kinetic theory, Molecular properties, Thermodynamics, Molecular beams, Mass transfer, Monte Carlo method, Relativity theory

The report presents a survey of some aspects of the kinetic theory of rarefied gases (neutral molecules) and a brief introduction to the characteristics of ensembles of identical charged particles. Consideration is given to the derivation and properties of the Boltzmann equation. The special form of the Boltzmann equation for free molecule flow and the associated boundary conditions governing the distribution function are discussed. The latter involves the interaction of gas particles with surfaces - a subject which is stil in an incomplete condition. The free molecule flux of particles at an orifice and an element of surface of a body are considered and results are applied to determine the aerodynamic properties of a sphere in a highly rarefied gas. The theory of free molecule motion is extended to include multiple collisions with surfaces. The subject of near-free-molecule flow is introduced by a consideration of molecular beams and the effect of collisions on beam strength. A review of molecular beam systems from the point of view of design is included. An integral equation form for the Boltzmann relation, which facilitates an iterative method of solution, is shown to be a suitable basis for a study of the properties of near-free-molecule flow. The required equations to be used for investigating the aerodynamics of isolated bodies in near-free-molecule flow are then discussed. (Author) (See also AD-277 144)

NASA-TR-R-171
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
THE CORRELATION OF OBLIQUE SHOCK PARAMETERS FOR RATIOS OF SPECIFIC HEATS FROM 1 TO 5/3 WITH APPLICATION TO REAL GAS FLOWS
Mitchel H. Bertram and Barbara S. Cook. Dec 63, 73p
N64-19235
OTS $1.75

DESCRIPTORS: *Gas flow, *Shock waves, *Specific heat,

NASA-TN-D-2282
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
STATIC STABILITY CHARACTERISTICS OF BLUNT LOW-FINENESS-RATIO BODIES OF REVOLUTION AT A MACH NUMBER OF 24.5 IN HELIUM
Robert D. Witcofski and William C. Woods. May 64, 49p
N64-19478
OTS $1.25

DESCRIPTORS: *Bodies of revolution, *Stability, Helium,

NASA-TN-D-2283
Langley Research Center, National Aeronautics and Space Administration, Langley Station, Va.
A STUDY OF THE STABILITY AND LOCATION OF THE CENTER OF PRESSURE ON SHARP, RIGHT CIRCULAR CONES AT HYPERSONIC SPEEDS
Jim A. Penland. May 64, 36p
N64-19322
OTS $1.00

DESCRIPTORS: *Conical bodies, Stability, Pressure, *Hypersonic characteristics,

AD-280 048
National Aeronautical Establishment, Ottawa (Canada).
ANALYSIS OF THE INCIDENCE OF A TAILPLANE FLUTTER ARISING FROM MODIFIED STIFFNESS AND ELASTIC COUPLING
H. F. L. Pinkney. Dec 61, 61p
Aeronautical rept. LR-320; N.R.C. no. 6761
OTS $6.60

DESCRIPTORS: *Stabilizers (Horizontal tail surface), *Flutter, Analysis, Mechanical properties,

A method of flutter analysis proposed by Niblett was examined and applied to the investigation of a suspected tailplane flutter incident. The procedural analysis is essentially one in which the elastic coupling necessary to sustain flutter at a critical speed may be ascertained as the dependent variable. The possible effect of structural damage in the case under consideration was studied and a flutter region was found and identified in terms of the known flight and aircraft parameters.

AD-416 485
National Aeronautical Establishment, Ottawa (Canada).
FLUTTER ANALYSIS OF A ROCKET FIN AT HIGH MACH NUMBERS
L. H. Ohman and R. C. Dixon. May 63, 37p
Aeronautical rept. LR-377; N.R.C. no. 7522
OTS $3.60

DESCRIPTORS: *Sounding rockets, *Fins, *Flutter, Stabilizers (Horizontal tail surface), Hypersonic characteristics, Supersonic characteristics, Aerodynamic heating, Damping, Mathematical analysis, Tables,

Flutter analysis of a rocket fin at Mach numbers from 2 to 7 was performed. The analysis was based on a number of preassigned mode shapes with piston theory representing the aerodynamic forces. Various mode combinations, effects of reduced stiffness due to kinetic heating, effects of structural damping and thickness effects as given by 2nd order piston theory, were considered. In the analysis the eigenvalues of the various dynamic systems were determined for flight cases along a given trajectory and for hypothetical flight cases to establish the flutter boundary. For 2-mode systems the eigenvalues were determined analytically. For systems with more than two modes an iterative procedure was developed to determine the eigenvalues. (Author)

Hydrodynamics, Hydraulics, and Hydrostatics

AD-438 916
Institute for Aerospace Studies, Univ. of Toronto (Canada).
LOW-ENERGY SPHERICAL UNDERWATER EXPLOSIONS
L. E. Heuckroth. Jan 64, 226p
UTIAS rept. no. 96
OTS $15.00

DESCRIPTORS: *Underwater explosions, *Explosion bubbles, Hydrodynamics, Shock tubes, Spherical bodies, Bubbles, Theory, Pressure, Velocity, Incompressible flow, Acoustics, Equation of state, Schlieren photography.

A detailed theoretical and experimental investigation of low-energy spherical underwater explosions was made. In the theoretical analysis, an explicit solution to the analogous one-dimensional problem (hydrodynamic shock tube) is first presented. The properties of the spherical high pressure gas cavity are analyzed by simple incompressible bubble theory and detailed numerical results for the period and amplitude of oscillation and for the time variation of the radial motion, velocity, acceleration and the internal pressure and temperature of the bubble, all as functions of the initial conditions (i.e., diaphragm pressure ratio and type of driver gas) are compiled. Some numerical results for the variation of the flow properties (pressure and velocity) external to the gas bubble are also given, using incompressible theory. The one-dimensional and incompressible spherical results are quantitatively and qualitatively compared with planar and spherical acoustic theories. With these acoustic concepts and the one-dimensional results the simple bubble theory is refined and an improved modified bubble theory is proposed which accounts for the finite signal propagation times and the low compressibility of the water medium. Experimentally, the low-energy blasts have been generated by exploding 1 and 2-in. dia. glass spheres pressurized with various gases having specific heat ratios in the range of 1.09 to 1.67 in a 3-ft. dia. steel sphere under well-defined and safe conditions. The results were primarily recorded by schlieren optical systems. (Author)

AD-418 237
National Research Council of Canada, Ottawa. Div. of Mechanical Engineering.
EXPERIMENTAL DEVELOPMENT OF A PERFORATED WAVE ABSORBER OF SIMPLE CONSTRUCTION AND MINIMUM LENGTH
P. A. Hamill. May 63, 28p
Mechanical Engineering rept. MB-252; N.R.C. no. 7472
OTS $2.60

DESCRIPTORS: *Water waves, Attenuation, Absorption, Breakwaters, *Beaches, Models (Simulations), *Model basins.

The principle of the perforated vertical wall breakwater was used in an experimental programme to develop a new type of wave absorber. Model tests have shown that low reflection coefficients can be obtained from a single layer construction of relatively short length. The new beach may be expected to find application in model wave testing facilities. (Author)

AD-418 111
National Research Council of Canada, Ottawa. Div. of Mechanical Engineering.
PROPOSALS FOR THE PRESENTATION OF RESISTANCE AND PROPULSION DATA
S. T. Mathews. Jun 63, 17p
Mechanical Engineering rept. MB-253; N.R.C. no 7525
OTS $1.60

DESCRIPTORS: *Drag, *Hulls (Marine), *Hydrodynamic configurations, Standards, Fluid dynamic properties, Symposia, Model basins, Propellers (Marine), Theory, *Marine propulsion,

This report is related to the work of the International Towing Tank Conference Presentation Committee, as described in the introduction. Some general remarks on presentation, and a tabulated summary of symbols used in various establishments, are given. As a starting point for discussion, proposals are made for six additional geometric coefficient symbols, in place of the so-called "circular notation". Five basic resistance-power coefficient symbols are suggested together with four symbols for propeller coefficients of a type not already in the I.T.T.C. list. A few other symbols, and some proposed guidance rules for presentation, are also recommended. (Author)

METALLURGY

TID-3577
Atomic Energy Commission, Oak Ridge, Tenn. Div. of Technical Information Extension.
FLUXES AND THEIR USE IN SOLDERING ALUMINUM. A literature search
James M. Jacobs, comp. Feb 64, 26p.
OTS $0.50

DESCRIPTORS: *Bibliographies, *Aluminum, *Soldering.

NAA-SR-7465
Atomics International, Canoga Park, Calif.
PREPARATION OF URANIUM MONOCARBIDE SINGLE CRYSTALS
H. Nadler. [30 Apr 64] 63p
Contract AT(11-1)GEN-8
OTS $1.50

NAA-SR-8262
Atomics International, Canoga Park, Calif.
STUDY OF METALLURGICAL DEFECTS IN APM PRODUCTS
P. B. Ferry and W. H. Friske. [15 Apr 64] 31p
Contract AT(11-1)GEN-8
OTS $0.75

WAPD-275
Bettis Atomic Power Lab., Pittsburgh, Pa.
EFFECT OF HYDROGEN AND HYDRIDE MORPHOLOGY ON THE TENSILE PROPERTIES OF ZIRCALOY-2
W. J. Babyak, W. F. Bourgeois, and G. J. Salvaggio. Nov 63, 48p
Contract AT(11-1)GEN-14
OTS $1.25

DESCRIPTORS: *Hydrogen, Zirconium, Hydrides

AD-430 776 repriced
Naval Ordnance Lab., White Oak, Md.
LAMINAR BOUNDARY LAYER CALCULATIONS BY FINITE DIFFERENCES
W. Parr. Mar 64, 22p
Mathematics Dept. rept. M-42; NOLTR 63-261; N64-16070
OTS $0.75

DESCRIPTORS: *Laminar boundary layer, Numerical methods & procedures, *Axially symmetric flow, Compressible flow, Incompressible flow, Partial differential equations, Boundary value problems, Mathematical analysis, Series.

Calculation of the laminar boundary layer in axially symmetric flow by the use of finite differences is described. Discussed are the Prandtl differential equations, finite difference approximations, stability, convergence, starting procedures, and the gas assumptions. The principal advantage of finite differences is that no simplifying assumptions whatsoever are necessary. (Author)

PB-165 347
Sferi-Coanda, Clichy (France).
APPLICATION TO THE LENTICULAR AERODYNE, PART III. Final rept. [1963] 26p
Contract AF61(514)1049
AFOSR-TR-58-135, Part III
OTS $2.60

DESCRIPTORS: *Coanda effect, Fluid flow, *Aircraft, *Vertical take-off planes, Design, Operation, Scientific research, France.

General considerations which led to the choice of the present draft project, and description of the proposed aircraft are presented. The Control system and preliminary designs for the "Lenticular Aerodyne" are described. (See also PB-165 346)

PB-165 345
Sferi-Coanda, Clichy (France).
THE COANDA EFFECT, PART I. Final rept. [1963] 239p
Contract AF61(514)1049
AFOSR-TR-58-135, Part I; AD-204 073
OTS $15.50

DESCRIPTORS: *Coanda effect, *Fluid flow, Jets, Gas flow, Nozzle gas flow, Aerodynamics, Graphics, Photographic analysis, Mathematical analysis, Scientific research, France.

A physical analysis and a mathematical analysis of the Coanda effect are given. The reciprocal action of two gases or two compressible fluids is studied. The limits within which it is possible to transfer the kinetic energy available in a small mass of gas driven at great speed to another and much greater mass is also considered.

PB-165 346
Sferi-Coanda, Clichy (France).
GENERAL CONDITIONS OF THE TESTS MADE AT THE "COANDA CENTER", MALPAIRE, PART II. Final rept. [1963] 235p
Contract AF61(514)1049
AFOSR-TR-58-135, Part II; AD-204 074
OTS $15.50

DESCRIPTORS: *Coanda effect, *Nozzles, Configuration, *Fluid flow, Performance (Engineering), Test equipment, Tests, Photographs, Graphics, Scientific research, France,

One of the objects of the tests was to make a comparative study, for a given nozzle, of various different adjustments possible, obtained by varying the feed pressure and the dimensions of the slot opening. Having done this, the performance of different nozzles belonging to the same category of homothetic or similar nozzles was compared. Finally, on the basis of the above-mentioned tests, it was possible to deduce which category of nozzles had the highest efficiency. A qualitative study of the nozzles was also attempted. (See also PB-165 345)

PB-165 971
Space Sciences Lab., General Electric Co. [Philadelphia, Pa.]
ON THE STABILITY OF A LAMINAR BOUNDARY LAYER FOR A MAXWELLIAN FLUID
K. S. Wen. Dec 63, 35p
Technical Information Series R63SD102; N64-18467
OTS $3.60

DESCRIPTORS: *Laminar boundary layer, *Viscoelasticity, *Fluids, Stability, Drag, Reduction, Equations

It has been discovered that certain non-Newtonian fluid stabilizes the laminar boundary layer significantly. The present investigation is a preliminary effort toward the understanding of the mechanism behind this unusual phenomenon. The fluid model chosen is that of a Maxwellian fluid the mechanical property of which is characterized by a relaxation time. The stability of a laminar boundary layer is then considered. It is found qualitatively that the minimum critical Reynolds number is smaller than that in the Newtonian case and decreases with increasing relaxation time. Therefore, the boundary layer will become more unstable compared with the Newtonian case. However, the results of this investigation point toward another fluid model which possess a highly stabilizing characteristic. (Author)

size-stress relationships for fracture of quenched and tempered and maraging steels and of titanium alloys. Additional information was developed on the relationships of various fracture tests for these materials. Heat-treatment studies for steels and titanium alloys provided an expanded frame of reference for establishing the optimum fracture toughness level to be expected for specific levels of yield strength. The relationship of fatigue crack propagation rate to total strain range was determined for various quenched and tempered steels. (Author)

OTS SB-401, Suppl. 1
Office of Technical Services, Dept. of Commerce, Washington, D. C.
CORROSION. Sep 63, 61p
OTS Selective Bibliography SB-401, suppl. 1
OTS $0.10

DESCRIPTORS: *Bibliographies, *Corrosion, Corrosion inhibition, Coatings, Corrosion-resistant alloys.

Lists 936 domestic and foreign references on corrosion added to the OTS collection from 1959 through September 1963. Reports are listed in the following categories: Corrosion Resistant Coatings; Corrosion Resistant Alloys; Corrosion Inhibitors and Inhibition; Stress Corrosion; Corrosion, General; and Rust Prevention and Removal.

AD-422 116
Universal-Cyclops Steel Corp., Bridgeville, Pa.
WELDING OF REFRACTORY METLAS. Interim rept. no. 3, 1 Apr-30 Jun 63
F. D. Seaman and D. J. Seman. Jul 63, 48p
Contract NOw-63-0043-c
N63-19496
OTS $4.00

DESCRIPTORS: *Refractory metal alloys, *Molybdenum alloys, *Niobium alloys, *Tantalum alloys, Tungsten alloys, *Welding, *Arc welding, Electrodes, Gases, Welds, Physical properties

Weld parameters, speed, amperage, electrode configuration, atmosphere, and arc length are discussed with respect to the physical dimensions of the weld. A review of the work to be performed in Phase II of the contract is presented. Descriptions of the welding equipment to be used are included. (Author) (See also AD-421 905)

GEAP-4089 (Vols. I&II)
Vallecitos Atomic Lab., General Electric Co., San Jose, Calif.
PROCEEDINGS OF THE USAEC SYMPOSIUM ON ZIRCONIUM ALLOY DEVELOPMENT [HELD AT] CASTLEWOOD, PLEASANTON, CALIFORNIA, NOVEMBER 12-14, 1962
H. H. Klepfer, comp. 30 Nov 62, 664p
Contract AT(04-3)189
EURAEC-594
OTS $7.50

DESCRIPTORS: *Conferences, *Zirconium alloys

USBM-U-1109
Albany Metallurgy Research Center, Ore.
METALLURGICAL PROGRESS REPORT NO. 22, JANUARY 1-MARCH 31, 1964. [1964] 25p
Contract AT(11-1)599
OTS $0.75

Y-1455
Union Carbide Nuclear Co., Oak Ridge, Tenn.
EFFECT OF EXPLOSIVE IMPACTING ON URANIUM
R. B. Burditt, W. T. Carey, and C. P. Coughlen.
17 Jun 63, 86p
Contract W7405-eng-26
OTS $2.00

HW-74949
Hanford Atomic Products Operation, Richland, Wash.
QUANTITATIVE METALLOGRAPHY OF HYDRIDE PHASE IN ZIRCALOY-2 PROCESS TUBES
L. A. Hartcorn and R. E. Westerman. Nov 63, 18p
Contract AT(45-1)1350
OTS $0.50

NUCLEAR PHYSICS AND NUCLEAR CHEMISTRY

ANL-6814
Argonne National Lab., Ill.
A COMPARISON OF NUCLIDIC MASS EQUATIONS WITH EXPERIMENTAL DATA
James Wing. Jan 64, 86p
Contract W31-109-eng-38
OTS $2.00

WASH-1046[EANDC(US)-50 "U"]
Argonne National Lab., Ill.
REPORTS TO THE AEC NUCLEAR CROSS SECTIONS ADVISORY GROUP MEETING AT E. I. DU PONT DE NEMOURS AND CO., SAVANNAH RIVER LABORATORY, JANUARY 28-30, 1964.
A. B. Smith, comp. [1964] 126p
OTS $2.50

NAA-SR-8684
Atomics International, Canoga Park, Calif.
THE AGE OF FISSION NEUTRONS TO INDIUM RESONANCE ENERGY IN GRAPHITE: PART II. THEORY
Harry Alter. 15 Apr 64, 42p
Contract AT(11-1)GEN-8
OTS $1.00

N64-18279
General Atomic Div., General Dynamics Corp., San Diego, Calif.
CALCULATION OF SLOW NEUTRON SCATTERING CROSS-SECTIONS OF MOLECULAR HYDROGEN AND DEUTERIUM. Topical rept.
James A. Young and Juan U. Koppel. 20 Dec 63, 45p
Contract NAS3-4214
GA-4828; NASA CR-54001
OTS $4.60

DESCRIPTORS: *Hydrogen, *Deuterium, *Neutron cross sections.

WAPD-283
Bettis Atomic Power Lab., Pittsburgh, Pa.
EFFECTS OF SILICON, NITROGEN, AND OXYGEN ON THE CORROSION AND HYDROGEN ABSORPTION PERFORMANCE OF ZIRCALOY-2
S. Kass, J. D. Grozier, and F. L. Shubert.
Nov 63, 44p
Contract AT(11-1)GEN-14
OTS $1.00

AD-278 175
British Welding Research Association, Cambridge.
INFLUENCE OF ALLOYING ELEMENTS ON THE CONTINUOUS COOLING TRANSFORMATION AND WELDABILITY OF BINARY AND TERNARY ALLOYS OF IRON, PART I. Final technical rept., 1 Mar 61-28 Feb 62. [1962] 34p
Contract DA91-591-EUC-1719
Rept. no. C59/8/62-B2/32/62
OTS $3.60

DESCRIPTORS: *Iron alloys, *Welding, Phase studies, Grain structures (Metallurgy), *Martensite, Fracture (Mechanics), Carbon alloys, Silicon alloys, Manganese alloys, Nickel alloys, Chromium alloys.

Dilatometry was completed on a series of 42 alloys of iron and carbon as binary alloys and as ternary alloys with silicon, manganese, nickel and chromium in turn. Metallographic examination was made to substantiate and expand the continuous cooling transformation diagrams constructed from the dilatometric information. The martensitic microstructure of the iron-carbon alloys was examined using the electron microscope and several modes of crack initiation in martensite have been observed. Small cracks were noted where large martensite grains meet and also at prior austenite boundaries adjacent to the coincidence of large martensite grains. Bead-on-plate welding tests were made on the 42 alloys with low and high cooling rates in the heat-affected zone, and using electrodes giving weld metal with low and high hydrogen contents. Examination of cracking in these tests has shown that the cracks are always associated with martensite. An approximate relationship between heat-affected zone hardness and cracking was established from the welding tests. (Author)

AD-434 544 repriced
MSA Research Corp., Callery, Pa.
OPTIMUM PURIFICATION TECHNIQUES FOR THE REMOVAL OF CONTAMINANTS FROM LIQUID LITHIUM AND RUBIDIUM. Final rept., Feb 63-Jan 64
S. J. Rodgers, F. Tepper, W. J. Carter, and C. A. Palladino. Mar 64, 83p
Contract AF33(657)10373
APL-TDR-64-34; N64-18935
OTS $2.25

DESCRIPTORS: *Liquid metals, *Lithium, *Rubidium, Purification, Impurities, Oxygen, Nitrogen, Carbon, Hydrogen, Stainless steel, Zirconium, Zirconium alloys, Titanium alloys, *Heat exchangers, Liquid metal cooled reactors,

Techniques of analysis and purification of rubidium and lithium are described. A method for analysis of oxygen in rubidium based on freezing point depression was developed. The technique has a sensitivity of 10 ppm O_2 with a precision of ±10 ppm O_2. Oxygen was removed from rubidium by stainless steel, zirconium and 50%Zr-50%Ti alloy. Hot trapping is recommended for purification of rubidium. Cold trapping was shown to be ineffective in removing oxygen. With 10 psi overpressure of nitrogen above rubidium, no evidence of rubidium nitride formation was observed. Rubidium hydride did not form when hydrogen was bubbled through rubidium. Zirconium is recommended as a hot trapping material for lithium for removal of both oxygen and nitrogen. There was evidence that cold trapping would remove oxygen and nitrogen, also. (Author)

AD-429 782
National Aeronautical Establishment, Ottawa (Canada).
EXPERIMENTS ON CUMULATIVE FATIGUE DAMAGE OF A PRECIPITATION HARDENING AND OF A STRAIN HARDENING ALLOY WITH A STEP CHANGE IN TEMPERATURE
J. A. Dunsby. Oct 63, 67p
Mechanical Engineering rept. MS-108; N.R.C. no. 7666; N64-16200
OTS $6.60

DESCRIPTORS: *Aluminum alloys, *Stainless steel, Hardening, *Fatigue (Mechanics), Loading (Mechanics), Stresses, Thermal properties,

Experiments are described in which the test temperature was changed in the course of a fatigue test on unnotched specimens of 24S-T3 aluminum alloy and of type 301 stainless steel. The results show that, under the particular test conditions, the behaviour of the stainless steel, which is metallurgically stable at the temperatures involved, may be predicted to an acceptable accuracy by the linear cumulative damage rule. The behaviour of the unstable aluminum alloy is more complex but the average performance may be estimated from the linear cumulative damage rule provided that suitable data on the properties of the alloy after exposure to elevated temperature are available. (Author)

NLCO-905
National Lead Co. of Ohio, Cincinnati.
SUMMARY TECHNICAL REPORT FOR JANUARY 1-MARCH 31, 1964. 28 Apr 64, 76p
Contract AT(30-1)1156
OTS $1.75

AD-432 317 repriced
Naval Research Lab., Washington, D. C.
METALLURGICAL CHARACTERISTICS OF HIGH STRENGTH STRUCTURAL MATERIALS. Quarterly rept. no. 3
P. P. Puzak, K. B. Lloyd, and others. Jan 64, 55p
NRL rept. 6086
OTS $1.50

DESCRIPTORS: *Submarine hulls, Structural parts, Materials, *Steel, *Maraging steel, *Titanium alloys, Aluminum alloys, Molybdenum alloys, Metallurgy, Fracture (Mechanics), Stresses, Strain (Mechanics), Toughness, Strength, Heat treatment,

A progress report covering research studies in high strength, hull structural materials is presented. These studies included the development of preliminary flaw

NYO-10174
Union Carbide Corp., Tuxedo, N. Y.
RESEARCH IN ACTIVATION ANALYSIS. Final rept. 23 Apr 62-31 Jul 63.
Henry H. Kramer, Victor J. Molinski, Roy S. Tilbury, Werner H. Wahl, and Paul M. Stier. 30 Sep 63, 97p
Contract AT(30-1)2975
OTS $2.25

DESCRIPTORS: *Radioactivation analysis.

Instruments and Installations

K-1589
Oak Ridge Gaseous Diffusion Plant, Tenn.
A FIXED FILTER PAPER ALPHA AIR MONITOR
G. B. Seaborn. 23 Mar 64, 18p
Contract W7405-eng-26
OTS $0.50

ORNL-3540
Oak Ridge National Lab., Tenn.
A PROPOSAL FOR THE Mc^2 ISOCHRONOUS CYCLOTRON. A GENERAL PURPOSE HIGH-INTENSITY 810-MeV PROTON ACCELERATOR. 1 Nov 63, 320p
Contract W7405-eng-26
OTS $4.00

IDO-16965
Phillips Petroleum Co., Idaho Falls.
FUEL PLATE RESISTANCE THERMOMETER
R. H. Meservey. 15 Mar 64, 25p
Contract AT(10-1)205
OTS $0.50

PWAC-427
Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
DESIGN AND DEVELOPMENT OF LCRE FISSION-COUNTER PREAMPLIFIER. 31 Mar 64, 58p
Contract AT(30-1)2789
OTS $1.50

SLAC-26
Stanford Linear Accelerator Center, Stanford Univ., Calif.
DYNAMIC FIELD MEASUREMENTS WITH AN EMR MAGNETOMETER IN THE PULSED BEAM SWITCHING MAGNET. Technical rept.
J. J. Muray and R. A. Scholl. Feb 64, 22p
Contract AT(04-3)400
OTS $0.50

SLAC-27
Stanford Linear Accelerator Center, Stanford Univ., Calif.
TWO-MILE ACCELERATOR PROJECT. Quarterly status rept. nos. 1 and 7, 1 Oct-31 Dec 63. Feb 64, 102p
Contract AT(04-3)476; AT(04-3)400; and AT(04-3)515
OTS $2.00

N64-18291
Virginia Univ., Charlottesville.
STATUS REPORT NO. 1, Period ending 30 Nov 63
K. Ziock and R. C. Ritter. [1963] 4p
Grant NsG-455
NASA CR-53389
OTS $1.10

DESCRIPTORS: *Semiconductors, *Detectors.

Nuclear Engineering and Power

IDO-28621
Aerojet-General Nucleonics, San Ramon, Calif.
ARMY GAS-COOLED REACTOR SYSTEMS PROGRAM. Quarterly progress rept for 1 Oct-31 Dec 63. 15 Feb 64, 105p
Contract AT(10-1)880
OTS $2.25

ANL-6850
Argonne National Lab., Ill.
CALCULATIONS OF κ FOR SOME SMALL U^{233}-, U^{235}-, AND Pu^{239}- FUELED FAST REACTORS
W. G. Davey. Feb 64, 12p
Contract W31-109-eng-38
OTS $0.50

TID-3522(7th Rev.)
Atomic Energy Commission, Oak Ridge, Tenn. Div. of Technical Information Extension.
PEACEFUL USES FOR NUCLEAR EXPLOSIVES A SELECTED ANNOTATED BIBLIOGRAPHY
Hugh E. Voress, William F. King, and Carl R. Gerber Div. of Peaceful Nuclear Explosives, comp. Jan 64, 57p
OTS $1.25

DESCRIPTORS: *Bibliographies, *Underground explosions, *Nuclear explosions.

TID-7671
Atomic Energy Commission, Oak Ridge, Tenn. Div. of Technical Information Extension.
PROCEEDINGS OF THE CONFERENCE ON THE INTERRELATED ROLE OF UNIVERSITIES AND FEDERAL AGENCIES IN NUCLEAR EDUCATION, HELD AT GATLINBURG, TENNESSEE, AUGUST 26-27, 1963. SPONSORED BY AMERICAN NUCLEAR SOCIETY, AMERICAN SOCIETY FOR ENGINEERING EDUCATION, OAK RIDGE INSTITUTE OF NUCLEAR STUDIES.
Apr 64, 136p
OTS $2.50

TID-7669
Atomic Energy Commission, Oak Ridge, Tenn. Div. of Technical Information Extension.
THERMAL OPERATING PERFORMANCE OF NUCLEAR REACTORS. A PANEL DISCUSSION HELD AT THE FIFTH NATIONAL HEAT TRANSFER CONFERENCE, HOUSTON, TEXAS, AUGUST 8, 1962
David Miller, ed. (Argonne National Lab.) [1962] 101p
OTS $2.25

DESCRIPTORS: *Conferences, *Nuclear reactors, *Heat transfer.

HW-73381(Sup 1)
Hanford Atomic Products Operation, Richland, Wash.
TWO CROSS SECTION LIBRARIES FOR USE WITH MAC SHIELDING CODE
J. Greenborg. Jan 64, 112p
Contract AT(45-1)1350
OTS $2.25

UCRL-11371
Lawrence Radiation Lab., Univ. of California, Berkeley.
ANALYSIS OF THE 1.0- TO 1.4-BeV π^--p ENCHANCEMENT
Suh Urk Chung, Orin I. Dahl, Lyndon M. Hardy, Richard I. Hess, and George R. Kalbfleisch.
16 Apr 64, 13p.
Contract W7405-eng-48
OTS $1.60

UCRL-11238
Lawrence Radiation Lab., Univ. of California, Berkeley.
ISOMERISM IN $_{85}At^{212}$
W. Barclay Jones. Doctoral thesis. 3 Feb 64, 84p
Contract W7405-eng-48
OTS $2.00

UCRL-11077
Lawrence Radiation Lab., Univ. of California, Berkeley.
STABILITY AND OSCILLATION ANALYSIS OF MAGNETIC MIRROR SYSTEMS WITH CONDUCTING END PLATES
Shalom Fisher. Doctoral thesis. 19 Nov 63, 168p
Contract W7405-eng-48
OTS $2.75

NYO-10025
Little (Arthur D.) Inc., Cambridge, Mass.
THE EFFECT OF ELECTROPHILIC ADDITIVES ON THE RADIOLYTIC PRODUCTS OF ORGANIC CHAIN REACTIONS. Final rept.
Philip L. Levins, El-Ahmadi I. Heiba, and Donna D. McRitchie. 31 Dec 63, 52p
Contract AT(30-1)2904
OTS $1.25

DESCRIPTORS: *Radiation chemistry, *Organic compounds.

LADC-1463
Los Alamos Scientific Lab., N. Mex.
YIELD OF Mo^{99} FROM FISSION OF U^{235} AND U^{238}
James Terrell, W. E. Scott, J. S. Gilmore, and C. O. Minkkinen. 7 May 64, 5p
Contract W7405-eng-36
OTS $1.10

ORINS-44
Oak Ridge Inst. of Nuclear Studies, Tenn.
RADIOASSAY OF THIN-LAYER CHROMATOGRAMS: BLUEPRINTS FOR ZONAL SCRAPER
Fred Snyder, T. J. Alford, and Harry Kimble. Apr 64, 8p
Contract AT(40-1)GEN-33
OTS $0.50

ORNL-3599
Oak Ridge National Lab., Tenn.
THE EFFECT OF NITRIC ACID, THORIUM, FLUORIDE, AND ALUMINUM ON PROTACTINIUM ADSORPTION BY UNFIRED VYCOR GLASS
J. G. Moore. Apr 64, 17p
Contract W7405-eng-26
OTS $0.50

ORNL-3499(Vol. II)
Oak Ridge National Lab., Tenn.
NEUTRON PHYSICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING AUGUST 1, 1963. [1963] 148p
Contract W7405-eng-26
OTS $2.75

DESCRIPTORS: *Physics, *Neutrons, *Scientific research

ORNL-3533
Oak Ridge National Lab., Tenn.
THE PERFORMANCE OF AN ADVANCED EXPERIMENTAL STACKED-CLONE CONTACTOR: A HIGH-PERFORMANCE SOLVENT EXTRACTION MACHINE WITH POTENTIAL FOR APPLICATION TO VERY HIGHLY RADIOACTIVE SOLUTIONS
M. E. Whatley and W. M. Woods. Apr 64, 53p
Contract W7405-eng-26
OTS $1.50

ORNL-3518
Oak Ridge National Lab., Tenn.
RECOVERY OF FISSION PRODUCTS FROM WASTE SOLUTIONS BY SOLVENT EXTRACTION
D. E. Horner, D. J. Crouse, K. B. Brown, and B. Weaver. [1964] 37p
Contract W7405-eng-26
OTS $1.00

DESCRIPTORS: *Fission products, Phosphoric acids, Amines, Phenols, *Solvent extraction

ORNL-3479
Oak Ridge National Lab., Tenn.
SAFETY ANALYSIS OF THE OPERATION OF THE HIGH-RADIATION-LEVEL EXAMINATION LABORATORY
A. R. Olsen, J. P. Nichols, and Sigfred Peterson. [1963] 87p
Contract W7405-eng-26
OTS $2.00

DESCRIPTORS: *Laboratories, *Safety

DP-874
Savannah River Lab., Aiken, S. C.
DISSOLVING HIGHLY IRRADIATED Pu-Al ALLOY
William C. Perkins. Feb 64, 11p
Contract AT(07-2)1
OTS $0.50

DP-877
Savannah River Lab., Aiken, S. C.
RECOVERY OF FISSION PRODUCTS FROM PUREX WASTE
William E. Prout and E. Kenneth Dukes. Feb 64, 12p
Contract AT(07-2)1
OTS $0.50

IDO-16961
Phillips Petroleum Co., Idaho Falls.
STEP PROJECT. Quarterly technical rept. for period ending 30 Jun 63. [1963] 119p
Contract AT(10-1)205
OTS $2.50

PWAC-416
Pratt and Whitney Aircraft Div., United Aircraft Corp. Middletown, Conn.
LCRE AUXILIARY SYSTEMS TERMINATION REPORT. 9 Mar 64, 96p
Contract AT(30-1)2789
OTS $2.25

PWAC-412
Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
HARMONIC DRIVE DEVELOPMENT. 18 Mar 64, 39p
Contract AT(30-1)2789
OTS $1.00

PWAC-424
Pratt and Whitney Aircraft Div., United Aircraft Corp., Middletown, Conn.
LCRE NEUTRON SENSOR DEVELOPMENT PROGRAM. 23 Mar 64, 49p
Contract AT(30-1)2789
OTS $1.25

GEAP-4400
Vallecitos Atomic Lab., General Electric Co., San Jose, Calif.
ANALYSIS OF FAILURE OF TYPE 304 STAINLESS STEEL CLAD SWAGED POWDER FUEL ASSEMBLY
E. A. Lees. 3 Oct 63, 48p
Contract AT(04-3)361
OTS $1.25

DESCRIPTORS: *Reactor fuel elements, *Boiling water reactors.

APED-4236
Vallecitos Atomic Lab., General Electric Co., San Jose, Calif.
CONTROL AUGMENTATION CRITICAL EXPERIMENTS
T. R. Jaworowski, P. G. Aline, and H. D. Kosanke. 15 Jul 63, 75p
Contract AT(04-3)189
OTS $2.00

DESCRIPTORS: *Critical assemblies, *Uranium, *Oxides, *Reactor lattice parameters, Heavy water.

PHYSICS

AD-420 983
American Optical Co., Southbridge, Mass.
EXPERIMENTAL VERIFICATION OF SUN-POWERED LASER TRANSMITTER. Final rept., Mar 62-May 63
G. R. Simpson. Aug 63, 116p
Contract AF33(657)8619
ASD-TDR-63-727; N64-12870
OTS $9.60

DESCRIPTORS: Feasibility studies, *Lasers, *Light communication systems, Solar radiation, Optics, *Optical equipment, Neodymium, Calcium compounds, Tungstates, Experimental data.

The effort expended on a program of design and experimentation leading to the delivery of an experimental model of a sun-powered laser transmitter is detailed. Analytical work is presented which resulted in the choice of Nd:$CaWO_4$ and Nd:glass as candidates for CW sun-powered operation. The design and fabrication of the transmitter mount, pump optics and laser cavities is described. Cooling techniques developed (primarily oriented toward $CaWO_4$ although generally applicable to any solid laser material operating at room temperature) and the design of the cooling system are detailed. Experimental evaluation of a number of laser configurations of the materials discussed is presented. Evidence is given of quasi-continuous sun-powered operation of Nd:glass. Appendices are provided which give (1) definition and measurement of loss coefficient "s", (2) the derivation of the figure of Merit "G" for a 4-level system based on quantities β , the gain coefficient for light in a laser and "s", (3) the derivation of the gain coefficient β, (4) the method of calculation of the power output of a CW laser oscillator, (5) the method used in obtaining thermal conductivity measurements and (6) a description of the original room temperature operation of glass lasers. Finally, recommendations are given for future investigations of sun-powered laser operation. (Author)

NYO-10435
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
ASYMPTOTIC DESCRIPTION OF THE CUSPS OF A HYDROMAGNETIC FIGURE OF EQUILIBRIUM
Robert E. Dowd. 1 Feb 64, 77p
Contract AT(30-1)1480
MF-37
OTS $7.60

NYO-10434
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
FINITE AMPLITUDE COMPRESSION WAVES IN A COLLISION-FREE PLASMA
K. W. Morton. 15 Jan 64, 107p
Contract AT(30-1)1480
MF-36
OTS $9.10

NYO-10436
Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
MODERATELY STRONG OBLIQUE SHOCKS AND SIMPLE WAVES IN STEADY MAGNETOHYDRODYNAMIC FLOW
Y. M. Lynn. 14 Feb 64, 66p
Contract AT(30-1)1480
MF-38
OTS $6.60

APDA-156
Atomic Power Development Associates, Inc., Detroit, Mich.
DESIGN AND ECONOMIC EVALUATION OF FIXED BLANKETS FOR FAST REACTORS
A. E. Klickman, G. L. Ball, J. J. Edwards, W. H. Jens, and B. M. Segal. 30 Aug 63, 62p
Contract AT(11-1)865
OTS $1.50

DESCRIPTORS: *Fast reactors

NAA-SR-6387
Atomics International, Canoga Park, Calif.
OPTICAL, LIGHTING, AND PHOTOGRAPHIC EQUIPMENT FOR THE SRE RECOVERY PROGRAM
E. R. Meise. [15 Apr 64,] 51p
Contract AT(11-1)GEN-8
OTS $1.25

NAA-SR-7020
Atomics International, Canoga Park, Calif.
REACTOR KINETICS MEASUREMENTS IN HOMOGENEOUS, STATIONARY, LINEAR EXTENDED SYSTEMS
M. N. Moore. [15 Apr 64] 23p
Contract AT(11-1)GEN-8
OTS $0.50

WAPD-244
Bettis Atomic Power Lab., Pittsburgh, Pa.
FABRICATION DEVELOPMENT OF BORON CARBIDE AND BORON CARBIDE + SILICON CARBIDE MIXTURES FOR POSSIBLE APPLICATION AS LUMPED BURNABLE POISONS IN PWR-2
S. F. Kaufman. Jan 64, 46p
Contract AT(11-1)GEN-14
OTS $1.00

WAPD-MRP-107
Bettis Atomic Power Lab., Pittsburgh, Pa.
PRESSURIZED WATER REACTOR (PWR) PROJECT. Technical progress rept. for 24 Oct 63-23 Jan 64.
[May 64] 135p
Contract AT(11-1)GEN-14
OTS $2.50

BNL-838(T-329)
Brookhaven National Lab., Upton, N. Y.
THE NUCLEAR REACTOR COMES OF AGE. Brookhaven lecture series no. 31.
Jack Chernick. 13 Nov 63, 19p
T-329
OTS $0.50

APEX-603(Del.)
General Electric Co., Cincinnati, Ohio.
STATIC CONTROL CHARACTERISTICS OF FAST REACTORS
A. W. Culp, Jr., E. M. Page, and J. W. Stephenson, Jr. 15 Oct 59, declassified 14 Sep 62. 154p
Contracts AF33(600)38062 and AT(11-1)171
OTS $11.50

GEAP-4351
General Electric Co., San Jose, Calif.
MATERIALS FOR SUPERHEAT FUEL SHEATHS. RELATIVE PERFORMANCE OF ALLOYS IN SUPERHEATED STEAM ENVIRONMENTS
F. A. Comprelli, D. F. MacMillan, and C. N. Spalaris Jul 63, 101p
Contract AT(04-3)189
OTS $2.25

DESCRIPTORS: *Reactor fuel elements, *Reactor fuel cladding,

GEAP-4203
General Electric Co., San Jose, Calif.
METHODS FOR IMPROVING THE CRITICAL HEAT FLUX FOR BWR'S
C. L. Howard. Mar 63, 76p
Contract AT(04-3)189
OTS $2.00

DESCRIPTORS: *Boiling water reactors

HW-81169
Hanford Atomic Products Operation, Richland, Wash.
HANFORD STUDIES EXECUTED FOR THE USAEC-AECL COOPERATIVE PROGRAM ON DEVELOPMENT OF HEAVY WATER MODERATED POWER REACTORS. Monthly progress rept. for Feb 64.
F. W. Albaugh, comp. 10 Mar 64, 5p
Contract AT(45-1)1350
OTS $1.10

HW-78080
Hanford Atomic Products Operation, Richland, Wash.
ZIRCONIUM CONCENTRATION MEASUREMENTS IN THE PRTR PRIMARY COOLANT. Interim rept. for 8 Dec 62-30 Jun 63.
T. F. Demmitt. Jul 63, 16p
Contract AT(45-1)1350
OTS $0.50

IDO-16871-2
Phillips Petroleum Co., Idaho Falls.
FUNDAMENTALS IN THE OPERATION OF NUCLEAR TEST REACTORS. VOL. II. MATERIALS TESTING REACTOR DESIGN AND OPERATION. Oct 63, 176p
Contract AT(10-1)205
OTS $2.75

IDO-16908
Phillips Petroleum Co., Idaho Falls.
PREDICTING EXCESS REACTIVITY IN THE ETR AS A FUNCTION OF POWER-TIME
J. W. Henscheid and E. E. Burdick. 5 Apr 64, 52p
Contract AT(10-1)205
OTS $1.25

IDO-16948
Phillips Petroleum Co., Idaho Falls.
SHUTDOWN REACTIVITY BY THE MODIFIED ROD DROP METHOD
K. V. Moore. 10 Mar 64, 19p
Contract AT(10-1)205
OTS $0.50

AD-429 501
Brown Univ., Providence, R. I.
THE VISCOSITY OF THE ISOTOPES OF HYDROGEN AND THEIR INTERMOLECULAR FORCE POTENTIALS
J. Kestin and A. Nagashima. Dec 63, 26p
Contract Nonr-3623(00)
Proj. Squid Technical rept. BRN-11-P
OTS $2.60

DESCRIPTORS: *Hydrogen, *Deuterium, Hydrogen compounds, Deuterated compounds, Isotopes, Viscosity, Molecular association, Electric potential, Impurities.

The paper presents carefully measured values of the viscosity of the three isotopes of hydrogen: H_2 HD, and D_2 at 20°C and at 30°C, all under atmospheric pressure. The ratios of the viscosity of any one pair of the above gases is obtained very accurately, the major source of error being connected with the uncertainties in our knowledge of the impurities present in the gases. On the basis of the Chapman-Enskog theory for the viscosity of gases composed of spherically-symmetrical molecules whose potentials can be represented by the product V(r) f (o/r), it is concluded that all three isotopes have different intermolecular constants. However, the differences which characterize the intermolecular potentials of H_2 and D_2 are not likely to be large. (Author)

UCRL-11229
Lawrence Radiation Lab., Univ. of California, Berkeley.
STUDIES IN MOLECULAR STRUCTURE: I. NEAR-ULTRAVIOLET SPECTRUM OF TETROLALDEHYDE. II. SIMPLE MOLECULAR ORBITAL THEORY OF THE DICHLOROETHYLENES. III. HIGH-TEMPERATURE MICROWAVE SPECTROSCOPY
James S. Muirnead. Doctoral thesis. 29 Jan 64, 92p
Contract W7405-eng-48
OTS $2.00

AD-429 502
Metcalf [Research Lab.] Brown Univ., Providence, R. I.
VISCOSITY OF HYDROGEN, DEUTERIUM, METHANE, AND CARBON MONOXIDE FROM -50°C TO 150°C BELOW 200 ATMOSPHERES
A. K. Barua, J. Ross, and M. Afzal. Jan 64, 21p
Contract Nonr-3623(00)
Proj. Squid Technical rept. BRN-10-P; N64-15762
OTS $2.60

DESCRIPTORS: *Hydrogen, *Deuterium, *Methane, Carbon compounds, Monoxides, Viscosity, Molecular association, Electric potential.

The absolute viscosities of H_2, D_2, CH_4, and CO were determined from measurements in a capillary-flow viscometer in the temperature range from -50°C to 150°C and at pressures below 200 atm with an average precision of 0.05%. The accuracy of the measurements, except for D_2, is estimated to be about 0.1%. The parameters (ϵ, γ_m, d) of the intermolecular exp-six potential were estimated for H_2 and D_2 from the variation of the viscosity with temperature at low density. The size parameter γ_m is the same for the two systems, but ϵ is about 6% larger for H_2 than D_2. (Author)

AD-270 622
Bowling Green State Univ., Ohio
INVESTIGATION OF EMISSION PROPERTIES OF LUMINESCENT SCREENS. Final rept.
D. W. Bowman and E. B. Singleton. 30 Sep 61, 23p
Contract DA33-019-ORD-3355
OTS $2.60

DESCRIPTORS: *Luminescent, *Fluorescent screens, Emissivity, Manufacturing methods, Vapor plating, Vacuum apparatus, *Phosphorescent materials,

Unsuccessful attempts were made to fabricate fluorescent screens by vacuum evaporation processes. Some screens were fabricated by settling process. No enhancement in fluorescent response was noted when the screens were placed in an electric field. Spectrophotometric curves were taken for commercial as well as specially fabricated screens. A fatigue effect was noted for all screens under continual x-ray excitation. (Author)

PB-166 023
Illinois Univ., Urbana.
THERMODYNAMICS OF THE SUPERCONDUCTING TRANSITION.
Technical rept. no. 17 on Investigation of The Phenomenon of Superconductivity
D. E. Mapother. Jun 59, 44p
Contract DA11-022-ORD-992
AD-217 965
OTS $4.60

DESCRIPTORS: *Superconductivity, *Thermodynamics, *Superconductors, Theory, Specific heat, Lead, Mercury, Excitation, Phase studies, Tin, Entropy, Magnetic properties.

The standard thermodynamic argument is applied to the analysis of critical field curves which deviate from the parabolic law, $H_C = H_0(1 - t^2)$, where $t = T/T_C$. Discussion is in terms of the experimentally observed deviation function, D(t), which measures the departure of experimental H_C values from the parabolic law. D(t) affords a convenient visualization of the source of the well known discrepancy between calorimetric and magnetically determined values of the temperature coefficient of the normal electronic specific heat, γ. The discrepancy is shown to be a consequence of the exponential temperature dependance of the superconducting electronic specific heat, C_{es} (a point previously demonstrated by Lynton, Sarin, and Zucker). Together with the fact that H_C measurements were not available for sufficiently small values of t. However, this discrepancy is peculiar to the apparent majority of superconducting elements which exhibit a negative D(t) (e. g. tin), and it does not arise for the elements lead and mercury which show a positive D(t). For the latter elements this permits a rather accurate determination of both γ and C_{es} from critical field measurements.

NASA-TN-D-2279
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
TRANSPORT EQUATIONS FOR A PARTIALLY IONIZED GAS IN AN ELECTRIC FIELD
Peter M. Sockol. Apr 64, 22p
N64-19291
OTS $0.50

DESCRIPTORS: *Gas ionization, *Transport properties, Electric fields, Differential equations

LA-3056
Los Alamos Scientific Lab., N. Mex.
SCATTERING FACTORS COMPUTED FROM RELATIVISTIC DIRACSLATER WAVE FUNCTIONS
D. T. Cromer and J. T. Waber. Jan 64, 222p
Contract W7405-eng-36
OTS $3.00

AD-437 257 repriced
Midwest Research Inst., Kansas City, Mo.
INVESTIGATION OF THE FLASHING AEROSOLS.
Final rept., 18 Mar 63-17 Apr 64
Alan R. Pittaway. 20 Apr 64, 73p
Contract DA18-108-AMC-118(A)
OTS $2.00

DESCRIPTORS: *Aerosols, Flammability, *Chemical warfare agents, *Explosive gases, Air, *Ignition, *Detonation, *Combustion products, *Shock waves, Aerosol generators, Shock tubes, Combustion chambers,

This program is concerned with determining flammability of aerosol systems. A complete review of the agent flashing problem is presented together with an analysis of the problem as a whole. A constant pressure combustion chamber and a shock tube were constructed to study aerosol flammability. Studies were conducted with QL-air aerosols, detonation product gas-air mixtures, and the three component detonation product gas-QL-air system. The data show that the system flammability is dictated by the detonation product gas-air flammability and is not significantly affected by the aerosol phase. Moderate strength shock waves will ignite the system but hot metal and glowing carbon particles will not, under the conditions tested. The QL aerosol-air mixture is easily ignited by flame but not by spark. QL aerosol-air mixtures burn with difficulty due to inhibition of the combustion by the products of combustion. The data support the hypothesis that the combustion of the detonation product gas is the primary aerosol flashing ignition source. It also supports the contention that the aerosol burns (in the general case) only in the presence of the combusting product gas mixture. Recommendations are made to continue the study using other aerosol materials and to investigate direct aerosol combustion and ignition inhibition. (Author) (See also AD-411 223)

NASA-SP-3008
National Bureau of Standards, Washington, D. C.
ENERGY SPECTRA AND ANGULAR DISTRIBUTIONS OF ELECTRONS TRANSMITTED THROUGH SAPPHIRE (Al_2O_3) FOILS
Martin J. Berger and Stephen M. Seltzer. 1964, 109p
NASA Order R-80
N64-18416
OTS $2.50

DESCRIPTORS: *Electrons, Tables, Monte Carlo method, Foils,

AD-434 675 repriced
Nuclide Corp., State College, Pa.
VACUUM VIBRATOR ION SOURCE. Rept. for 1 Mar 63-28 Feb 64, on Chemistry and Physics of Materials L. A. Cambey. Mar 64, 19p
Contract AF33(657)11041
ML-TDR-64-75
OTS $0.50

DESCRIPTORS: Mass spectrometers, *Ion sources, *Vibrators (Electrical), Electrodes, Electric arcs, Sparks, Ionic current, Electric currents, Voltage, Mass spectra.

Three different vacuum vibrator sources were designed and constructed. These sources were tested on a single focusing mass spectrometer. A preliminary evaluation of the characteristics of the source, including ion current magnitude, ion current stability, and ion energy spread, and their dependence on arc voltage and arc current was carried out. Mass spectra obtained with the single focusing mass spectrometer are presented. (Author)

PB-166 018
Office of Scientific Research and Development, Div. 6
UNDERWATER SOUND EQUIPMENT II. ECHO-RANGING SYSTEMS. Summary technical rept. vol. 15
John S. Coleman. 1946, declassified 27 Oct 60, 263p
Contract OEMsr-1131
OTS $17.00

DESCRIPTORS: *Underwater sound equipment, *Echo ranging, *Sonar equipment, Detection, Naval equipment, Electronic equipment, Design.

This report describes the work undertaken to improve the operation of the type of echo-ranging system employed almost exclusively during World War II. In view of the urgent need for large quantities of serviceable gear to equip the expanding Navy, it was decided to avoid delay by concentrating on expanding the production of existing and proved designs. The section and its laboratories, in turn, concentrated upon a program of improvements calculated to facilitate maximum performance of these standard equipment types. As a result a number of auxiliary circuits and components were designed and constructed which were quickly adaptable to existing shipboard installations. Such modifications included methods for increasing the accuracy and ease of obtaining bearings, for improving the ability of the system to discriminate the target echo from background noise, and for reducing operator fatigue. These and parallel developments were all aimed at raising the performance level of the average sonar operator under typical operational conditions. An account of these developments is presented in some detail.

MATT-238
Plasma Physics Lab., Princeton Univ., N. J.
KINETIC THEORY OF WEAKLY COUPLED GASES
C. H. Su, E. A. Frieman, and M. D. Kruskal. Jan 64, 152p
Contract AT(30-1)1238
OTS $2.75

NASA-TN-D-2071
Lewis Research Center, National Aeronautics and Space Administration, Cleveland, Ohio.
ELECTROMAGNETIC WAVE PROPAGATION IN A COLD, COLLISIONLESS ATOMIC HYDROGEN PLASMA
Richard R. Woollett. Apr 64, 126p
N64-18954
OTS $2.75

DESCRIPTORS: Hydrogen, *Plasma physics, *Electromagnetic waves, *Propagation,

PB-165 325
Naval Radiological Defense Lab., San Francisco, Calif.
TRANSMISSION AND SCATTERING PROPERTIES OF A NEVADA DESERT ATMOSPHERE UNDER CLOUDY CONDITIONS
M. G. Gibbons, F. I. Laughridge, J. R. Nichols, and N. A. Krause. 9 Aug 60, 35p
Research and development technical rept. USNRDL-TR-461; DASA 1192; AD-249 485
OTS $3.60

DESCRIPTORS: *Nuclear explosions, *Thermal radiation, *Infrared radiation, Atmosphere, Clouds, *Wave transmission, Scattering, Recording devices, Photomultipliers, Nevada, Deserts

The angular scattering diagram of a Nevada desert atmosphere was measured for radiation of 0.40, 0.45, 0.50, and 0.55 micron wavelength. Attenuation coefficients for scattering and absorption were determined in the same atmosphere for radiation of 0.40, 0.50, 0.70 and 0.83 micron wavelength. All measurements were made under clear-sky and cloudy conditions and with source-receiver distances (d) ranging from 1.07 to 17.15 miles. The ratio (R) of scattered-in to direct radiation received from a 4 pi source was measured for wavelengths of 0.40, 0.50, 0.70 and 0.83 micron for the same values of D and for receiver fields of view ranging from 4 degree to 64 degree half-angle, with and without cloud cover. By extrapolation of the results to the case of a receiver with field of view of 90 degree half-angle, attenuation coefficients for aureoled transmission from a 4 pi source to a flat receiver facing the source and ratios (R) were determined for these wavelengths. Plots of R versus D showed that under conditions of little or no cloud cover (and in winter) R for each of the four wavelengths increases monotonically with D out to a distance of 17.15 miles. For the case of full overcast at 4000 ft abouve ground, R increases with D for distances up to about 10 miles and then decreases with increasing distance at least for the next few miles. For lower cloud height the maximum in R appears to move to smaller distances, approximately in proportion to cloud height. (Author)

RESEARCH METHODS, TECHNIQUES AND EQUIPMENT

PB-166 021
[Institute of Science and Tech.] Univ. of Michigan, Ann Arbor.
RESEARCH IN MACHINE TRANSLATION. I: GENERAL PROGRAM
Rept. on Proj. Michigan
Andreas Koutsoudas. Mar 59, 16p
Contract DA36-039-sc-52654
Rept. no. 2144-268-T; AD-212 773
OTS $1.60

DESCRIPTORS: *Machine translation, *Programming (Computers), Dictionaries, Physics.

The empirical and formal aspects of a computer program for machine translation of Russian into English are discussed. Statistical examination of a large Russian text in the field of physics has yielded regularities which, it is expected, can serve as the basis for a computer program. Simplicity of programming and

AD-426 311
Naval Research Lab., Washington, D. C.
AN APPLICATION OF BOSE-CHAUDHURI ERROR-CORRECTING CODES
F. A. Polkinghorn, Jr. 25 Sep 63, 14p
NRL rept. 5993
OTS $1.60

DESCRIPTORS: *Communication theory, Errors, Corrections, *Coding, Digital systems, Data transmission systems, Computers, Decoding,

This report proposes a solution to the problem of the use of error correcting codes on a particular multichannel hf radio circuit with a slowly time varying probability of bit error and states in detail a computer algorithm for this solution. The conclusion is reached that the single, double, and triple error correcting Bose-Chaudhuri codes of block length 31, which have been stunted to a block length of 30, should be used. A small general

PB-181 679
Netherlands Inst. for Documentation and Filing, The Hague
RESEARCH GUIDE: A GUIDE TO CONTRACT RESEARCH FACILITIES IN THE NETHERLANDS. 1963, 227p
OTS $3.50

DESCRIPTORS: *Scientific organizations, Scientific research, Laboratories, Test facilities, *Netherlands,

Data is given on the organizational data, scope of activities, current research projects, know-how, equipment, international relations, and publications of each of the organizations in the Netherlands available for contract research in the technical and natural sciences.

AD-405 517
Lincoln Lab., Mass. Inst. of Tech., Lexington.
DIVISION 8. SOLID STATE. Rept. for 1 Jan-31 Mar 63
Benjamin Lax, James W. Meyer, and Alan L. McWhorter.
15 Apr 63, 15p
Contract AF19(628)500
OTS $1.60

DESCRIPTORS: *Solid state physics, *Semiconductor devices, Materials, *Spectroscopy, Atomic energy levels, *Magnetic materials, Bibliographies,

A summary is given of research efforts in the areas of solid state device design, materials evaluation, band structure and spectroscopy of solids, and spectroscopy of magnetic solids. A 56 item listing of papers and speeches resulting from the research is given. (See also AD-295 737)

AD-405 145
Lincoln Lab., Mass. Inst. of Tech., Lexington
ENERGY-BAND CALCULATIONS
F. W. Quelle, Jr. (Doctoral thesis). 17 Jan 63, 50p refs
Contract AF19(628)500
Technical rept. no. 295; N64-12928
OTS $4.60

DESCRIPTORS: *Semiconductors, Valence, *Atomic energy levels, *Silicon, Electrical properties, Mathematical prediction, *Programming (Computers)

The orthogonalized plane wave energy-band structure of a solid can be self-consistently determined by use of the method described in the report. In this method, correct core functions are of prime importance. A wholly automatic computer program carries out all operations, including the symmetry adaptation of the basis set. The operation of this program is illustrated by a calculation of the band structure of silicon, and a comparison is made between the calculated results and the results obtained from experiment. Sources of error giving rise to discrepancies between theoretical and experimental results are discussed, and suggestions are made for the remedy of these errors. (Author)

Thermodynamics

PB-166 031
AeroChem Research Labs., Inc., Princeton, N. J.
THE THEORY OF RADIATION COOLING AT HIGH MACH NUMBERS
Daniel E. Rosner. 18 Nov 59, rev. Sep 60, 15p
Contract AF49(638)300
AeroChem TM-18; AFOSR TN-60-331
OTS $1.60

DESCRIPTORS: *Thermal radiation, *Cooling, Theory, Superaerodynamics, Supersonic Flow, Surface temperatures, Heat transfer, Transport properties, Mathematical analysis, Solids, Catalysts.

Considered here a steady state in which the convective heat transfer to a solid body is balanced entirely by radiation from it. The situation is completely analogous to an isothermal catalysis problem is explored, here, and results are presented for local and over-all rates of radiative energy transfer from flat plates in high speed streams. It is shown that if two plates differing only in their thermal conductivities are placed in identical gasdynamic environments, the insulating plate loses more energy by radiation than a perfectly conducting plate, thereby extracting more energy from the fluid. However, the maximum difference amounts to only about 2 1/2%, corresponding to values of a non-dimensional convection-radiation parameter θ near 2.4. By generalizing the conventional notion of laminar "recovery temperature" (4), these results are shown to apply also to active catalysts in dissociated streams, provided one can neglect the amount of atom recombination within the diffusion boundary layer. (Author)

NASA-CR-26
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
HIGH-TEMPERATURE, THIN-FILM RESISTANCE THERMOMETERS FOR HEAT TRANSFER MEASUREMENT
Leonard Bogdan. Apr 64, 30p
Contract NAS8-823
N64-17988
OTS $1.00

DESCRIPTORS: *Resistance thermometers, *Heat transfer.

HW-78724
Hanford Atomic Products Operation, Richland, Wash.
HIGH TEMPERATURE THERMODYNAMIC PROPERTIES OF HELIUM
D. R. Doman. Dec 63, 12p
Contract AT(45-1)1350
OTS $0.50

Wave Propagation

PB-165 327
Army Signal Radio Propagation Agency, Fort Monmouth, N. J.
IBM 704 PROGRAM TO DETERMINE THE MAXIMUM USABLE FREQUENCY (MUF) AND THE LOWEST USEFUL HIGH FREQUENCY (LUF) FOR HG RADIO PROPAGATION
S. E. Probst, G. E. Krause, and E. A. Clarke (Stanford Research Inst.)
Oct 59, 107p
Proj. no. 625
OTS $9.10

DESCRIPTORS: *Programming (Computers), High frequency, *Radio waves, *Propagation, Mathematical analysis, Programming languages, Digital computers

This report presents a detailed explanation and analyses of an IBM 704 program to determine the Maximum Usable Frequency (MUF) and the Lowest Useful High Frequency (LUF) for HF radio propagation. It is intended mainly to guide programmers toward a comprehensive understanding of the techniques developed, so that it may be used by other organizations. Necessary details are included so that a program, Appendix A, written for a specific propagation problem may be tailored to fit any general MUR-LUF propagation problem. (Author)

AD-288 580
System Development Corp., Santa Monica, Calif.
SYNTACTIC DEPENDENCE AND THE COMPUTER GENERATION OF COHERENT DISCOURSE.
Technical memo.
Sheldon Klein and Robert F. Simmons. 24 Sep 62, 36p
Technical memo. no. TM-758/000/00; ARPA SD-97
OTS $3.60

DESCRIPTORS: *Machine translation, *Computers, *Language, Vocabulary.

The hypothesis that there is in the English language a general principle of transitivity of dependence among word-elements is presented. An experiment in the computer generation of coherent discourse that supports this hypothesis is described which shows that dependency is not always a transitive relationship; some significant exceptions include the lack of transitivity across verbs, prepositions, and many subordinating conjunctions. It is stated that if these exceptions were ignored, the discourse generator could produce statements that were not truth-preserving derivations from the original text. Transitivity is as important for other languages as it is for the English language. (Author)

AD-433 830
System Development Corp., Santa Monica, Calif.
TOWARD THE ESTABLISHMENT OF A COMPUTER BASED CLASSIFICATION SYSTEM FOR SCIENTIFIC DOCUMENTATION
Harold Borko and Myrna D. Bernick. 19 Feb 64, 49p
Technical memo. no. TM-1763
OTS $4.60

DESCRIPTORS: *Documentation, Scientific research, Psychology, Reports, *Classification, Automatic, Computers, *Information retrieval, Data storage systems, Factor analysis

Experiments were conducted to determine whether factor-analytically derived classification categories are reliable, reasonable, and useful. A sample of 997 abstracts of psychological research papers was selected and divided into an Experimental and a Validation Group. These were factor-analyzed separately and the resulting categories compared to each other and to a previous study. The results show that factor-analytically derived classification categories are reliable and reasonable. Experiments were also performed to compare manual and automatic document classification. A contingency coefficient was used to measure inter-rater consistency of classification and the similarity of manual and machine classification. It was concluded that certain specialized document collections could advantageously use a factor-analytically derived classification schedule and automatic document classification. (Author)

PB-181 563
Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS. Jun 64.
OTS $1.25, $10.00/year

DESCRIPTORS: *Naval research, *Scientific research, Corrosion, Radio, Atmosphere, Radioactivity, Weather stations, Chemistry, Fatty acids, Alcohols, Mathematics, Thermodynamics, Metallurgy, Titanium alloys, Fatigue (Mechanics), Niobium, Refractory metals, Ferromagnetic materials, Carbides, Single crystals, Uranium, Aluminum alloys, Nuclear physics, Bubble chambers, Radar, Communication systems, Satellite antennas, Phase shifters, Waveguides, Electromagnetic lenses, Solid state physics, Crystal lattice defects, Luminescence, Sound, Acoustic equipment, Patents.

Contents:
Articles:
Identity of the Corrosion Products of Some Metals in Salt Water, by A. J. Pollard
Some Methods for World-Wide Atmospheric Radio Duct Measurement and Prediction, by D. L. Randall
Scientific Program:
Atmosphere and Astrophysics: Summary report on fission product radioactivity in the air along the 80th meridian (West) 1957-62. Code and sequencing system for automatic weather stations
Chemistry: Properties of monolayers of ω-monohalogenated fatty acids and alcohols adsorbed on water
Mathematics: A note on the general applicability of the thermodynamic efficiency formula
Metallurgy and Ceramics: Explosion tear test of titanium alloy plate. Metallographic study of fatigue damage. Niobium bicrystals. Influence of test conditions on the behavior of refractory metals. Ferromagnetic resonance of irradiated iron-nickel films. Carbides formed in Fe-Cr alloys oxidized in dry carbon dioxide. Growth of α-Al_2O_3 single crystals during the oxidation of Sn-Al alloys. Determination of uranium in steel. Low cycle fatigue crack propagation in 2024 aluminum alloy
Nuclear and Atomic Physics: Application of a television pickup to bubble chamber measurements
Radio: Polarization techniques and components for radar and communication systems. Broadband linear array for space surveillance. Study of a ferrite phase shifter. Ferrite component converts linear polarization propagating in rectangular waveguide into circular polarization propagating in circular waveguide or free space. Design considerations for two-dimensional symmetric bootlace lenses
Solid State Physics: Imperfections in ionic crystals. Luminescent sulfur centers in alkali halides and other inorganic solids. Dielectric loss in NaCl crystals
Sound: Microacoustic system analysis by the measurement of free-field sound speed
Published Reports
Papers by NRL Staff Members
Patents

AD-299 384
Ohio State Univ. Research Foundation, Columbus.
A STUDY OF WRITTEN COMMUNICATION. Final rept.
Franklin H. Knower. Nov 62, 99p
Contract AF30(602)2550
Rept. no. 4, Volume I; RADC-TDR-62-611, Vol. I
OTS $8.60

DESCRIPTORS: *Language, *Vocabulary, *Instruction manuals, Attitudes, *Military publications,

The study was undertaken to analyze linguistic and psychological causes of misunderstanding and misinterpretation of the messages in technical orders manuals of the United States Air Force. Normative functional, structural, and stylistic features of the language were established. Standardized methods of evaluation of the readability of the specialized and relatively homogeneous technical style did not prove conclusive. The original style was compared with five different rewritten samples of the material by use of comprehension impact and attitude test scores. Test item difficulty scores provided variable indices of sentence function, structure, and style impact. Both comprehension impact and attitudes favored more personalized and editorially simplified styles than the original. A telegraphese style which greatly reduced redudancy produced less impact and a less favorable attitude response than the original style. Control tests demonstrated effective control of major variables in the study. Vocabulary and organizational characteristics were seen as contributing factors in comprehension. Data were programmed and analyzed by use of the IBM 7070 computer. Principles for the writing of technical orders and illustrations were presented. (Author)

PB-166 008
Pennsylvania Univ. [Philadelphia].
THE TRANSFORMATIONAL GRAMMAR OF ENGLISH ADJECTIVES.
Rept. no. 52 on Transformations and Discourse Analysis Papers
Zeno Vendler. 1963, 62p
OTS $6.60

DESCRIPTORS: *Language, Classification, Analysis.

The adjectival classes and their transformational behavior were found to fall into a coherent and interesting pattern. The distinguishing segments of the main transformations (I) - (IV) are: (1) N wh... is A; (2) (2) N wh... is A for N; (3) N wh... [V+] D_A; (4) N wh... is A to [V-]. Wh... stands for the subject to which the adjective is ascribed one way or another. In (1) this occurs directly by means of the copula. In (2) A is attributed to wh... with respect to N. In (3) and (4) A is attributed to wh... with respect to a verb-class determined by the joined predication of A and N. (3) and (4) differ however, inasmuch as in (3) N is the subject, while in (4) N is the object of [V].

PB-165 972
Center for Documentation and Communication Research, Western Reserve Univ., Cleveland, Ohio.
AUTOMATIC PROCESSING OF METALLURGICAL ABSTRACTS FOR THE PURPOSE OF INFORMATION RETRIEVAL. Interim rept. NSF-2
Jessica S. Melton, Pamela W. Reeves, and Celeste F. Hespen. Feb 64, 111p
Grant NSF G-24488
OTS $9.60

DESCRIPTORS: *Information retrieval, *Data processing systems, Automatic, *Abstracts, Subject indexing, Metallurgy

The report describes progress in an attempt to automate subject indexing, which is perhaps the most difficult and expensive task of information systems when performed manually. Abstracts from the metallurgical section of Chemical Abstracts are punched on Flexowriter tape and converted to magnetic tape. The typegraphical characteristics of the printed text are preserved. Computer procedures are designed for processing the abstracts on a level above straight dictionary look-up while avoiding total linguistic analysis. Metallurgical terms in the text are located and grouped according to a strict subject-indexing rationale. Experience is reported in the analysis of 223 abstracts comprising 1290 sentences and approximately 20,000 words. From this corpus a lexicon of 3200 words has been compiled and classified, and 1500 rules for grouping metallurgical terms into machine-searchable index structures were formulated. Plans for testing the system and preliminary work in this direction are described. (Author)

AD-409 607
Milan Univ. (Italy).
MECHANICAL TRANSLATION: THE CORRELATION SOLUTION. Technical rept.
Silvio Ceccato, Enrico Maretti, Sergei Perschke, Nicolas Slater, and Ernst von Glasersfeld. 28 Feb 63, 310p
Contract AF61(052)362
RADC-TDR-63-280
OTS $19.75

DESCRIPTORS: *Machine translation, *Programming languages, *Programming (Computers), Language,

Linguistic analysis, coding, classifications and programming have been studied with a view to mechanical translation of random texts from one language to another. The procedure consists of three steps: from the input language to the correlational net; transformation of the net for the target language; and from the transformed net to the output. This method has so far been applied to Russian input and English output (about 50,000 cards). A provisional procedure was written in COMIT and run on the 7090 IBM computer. (Author)

AD-DIVISION INDEX

AD No.	Div.
600 000	17
600 001	8
600 002	10
600 003	16
600 004	25
600 005	15
600 006	24
600 007	9
600 008	17
600 009	30
600 011	2
600 012	2
600 013	30
600 014	30
600 015	2
600 016	9
600 017	8
600 018	8
600 019	8
600 020	8
600 021	9
600 022	15
600 023	2
600 024	8
600 025	8
600 026	8
600 027	30
600 028	8
600 029	17
600 030	14
600 031	13
600 032	8
600 033	14
600 034	17
600 035	17
600 036	28
600 037	28
600 038	28
600 039	2
600 040	30
600 041	19
600 042	9
600 043	17
600 044	7
600 045	25
600 046	8
600 047	30
600 048	8
600 049	8
600 050	2
600 051	2
600 052	23
600 053	1
600 054	20
600 055	15
600 056	15
600 057	20
600 058	22
600 059	22
600 060	26
600 061	3
600 062	25
600 063	4
600 064	28
600 065	18
600 066	9
600 067	14
600 068	9
600 069	2
600 070	17
600 071	4
600 072	4
600 073	4
600 074	2
600 075	2
600 076	25
600 077	16
600 078	2
600 079	30
600 080	4
600 081	18
600 082	25
600 083	12
600 084	8
600 085	4
600 086	17
600 087	22
600 088	17
600 089	25
600 090	20
600 091	12
600 092	30
600 093	1
600 094	8
600 095	8
600 096	8
600 097	9
600 098	9
600 099	8
600 100	12
600 101	15
600 102	9
600 103	2
600 104	16
600 105	8
600 106	28
600 107	19
600 108	1
600 109	1
600 110	30
600 111	15
600 112	17
600 113	30
600 114	4
600 115	9
600 116	8
600 117	30
600 118	8
600 119	7
600 120	8
600 121	14
600 122	24
600 123	16
600 124	16
600 125	25
600 126	8
600 127	8
600 128	2
600 129	16
600 130	25
600 131	25
600 132	8
600 133	16
600 134	1
600 135	20
600 136	25
600 137	1
600 138	9
600 139	28
600 140	19
600 141	19
600 142	8
600 143	20
600 144	9
600 145	20
600 146	30
600 147	16
600 148	16
600 149	25
600 150	17
600 151	16
600 152	17
600 153	4
600 154	2
600 155	9
600 156	2
600 157	16
600 158	25
600 159	25
600 160	30
600 161	15
600 162	15
600 163	8
600 164	15
600 165	4
600 166	4
600 167	8
600 168	8
600 169	1
600 170	1
600 171	16
600 172	20
600 173	25
600 174	8
600 175	14
600 176	28
600 177	25
600 178	25
600 180	4
600 181	28
600 182	25
600 183	9
600 184	26
600 185	5
600 186	9
600 187	31
600 188	17
600 189	22
600 190	26
600 191	26
600 192	26
600 193	26
600 194	26
600 195	26
600 196	26
600 197	26
600 198	26
600 199	26
600 200	26
600 201	26
600 202	26
600 203	26
600 204	26
600 205	26
600 206	26
600 207	26
600 208	26
600 209	26
600 210	26
600 211	26
600 212	8
600 213	8
600 214	15
600 215	1
600 216	8
600 217	
600 218	4
600 219	32
600 220	32
600 221	32
600 222	16
600 223	4
600 224	8
600 225	8
600 226	25
600 227	16
600 228	16
600 229	16
600 230	9
600 231	8
600 232	10
600 233	25
600 234	1
600 235	2
600 236	8
600 237	9
600 238	30
600 239	18
600 240	6
600 241	2
600 242	30
600 243	30
600 244	30
600 245	30
600 246	8
600 247	14
600 248	9
600 249	14
600 250	7
600 251	7
600 252	5
600 253	20
600 254	2
600 255	4
600 256	25
600 257	16
600 258	9
600 259	16
600 260	16
600 261	13
600 262	8
600 263	16
600 264	25
600 265	25
600 266	25
600 267	25
600 268	2
600 269	6
600 270	20
600 271	30
600 272	6
600 273	22
600 274	32
600 275	25
600 276	30
600 277	17
600 278	15
600 279	8
600 280	10
600 281	17
600 282	16
600 283	8
600 284	30
600 285	6
600 286	25
600 287	22
600 289	30
600 290	8
600 291	25
600 292	2
600 293	25
600 294	22
600 295	24
600 296	28
600 297	20
600 298	9
600 299	16
600 300	2
600 301	8
600 302	8
600 303	20
600 304	2
600 305	13
600 306	13
600 307	13
600 308	15
600 309	15
600 310	30
600 311	25
600 312	8
600 313	22
600 314	8
600 316	8
600 317	8
600 318	2
600 319	28

AD No.	Div.
600 669	12
600 670	2
600 671	2
600 672	1
600 673	22
600 674	26
600 675	30
600 676	25
600 677	1
600 678	30
600 679	14
600 680	8
600 681	25
600 682	8
600 683	12
600 684	20
600 685	8
600 686	15
600 687	25
600 688	17
600 689	27
600 690	31
600 692	9
600 693	2
600 694	1
600 695	17
600 696	8
600 697	23
600 698	20
600 699	16
600 700	13
600 701	8
600 702	28
600 703	14
600 705	16
600 706	26
600 707	20
600 708	8
600 709	20
600 710	20
600 711	8
600 712	2
600 713	6
600 714	24
600 715	8
600 716	12
600 717	1
600 718	16
600 719	12
600 720	25

AD No.	Div.
600 721	16
600 722	8
600 723	8
600 724	8
600 725	25
600 726	22
600 727	17
600 728	32
600 729	25
600 730	1
600 731	15
600 732	15
600 733	15
600 734	15
600 735	15
600 736	15
600 737	15
600 738	15
600 739	15
600 740	15
600 741	1
600 742	30
600 743	25
600 744	14
600 745	27
600 749	23
600 750	14
600 751	32
600 752	32
600 753	7
600 754	16
600 755	20
600 756	27
600 758	2
600 759	18
600 760	14
600 761	20
600 762	17
600 763	9
600 764	17
600 765	8
600 766	8
600 767	20
600 768	10
600 769	8
600 770	8
600 771	1
600 772	25
600 773	16
600 774	5

AD No.	Div.
600 775	1
600 776	30
600 777	16
600 778	15
600 779	30
600 780	14
600 781	23
600 782	28
600 783	1
600 784	17
600 785	16
600 786	2
600 787	16
600 788	4
600 789	4
600 790	17
600 791	17
600 792	17
600 793	17
600 794	17
600 795	17
600 796	8
600 797	8
600 798	25
600 799	25
600 800	2
600 801	2
600 802	16
600 803	17
600 804	28
600 805	10
600 806	16
600 807	8
600 808	16
600 809	9
600 810	30
600 811	14
600 812	16
600 813	14
600 814	17
600 815	4
600 816	4
600 817	9
600 818	1
600 819	2
600 820	25
600 821	8
600 822	1
600 823	28
600 824	24

AD No.	Div.
600 825	16
600 826	19
600 827	1
600 828	2
600 829	1
600 830	25
600 831	27
600 832	9
600 833	7
600 834	8
600 835	2
600 836	2
600 837	8
600 838	30
600 839	9
600 840	31
600 841	5
600 842	4
600 843	7
600 844	9
600 845	25
600 846	17
600 847	8
600 848	17
600 849	14
600 850	14
600 851	4
600 855	6
600 856	6
600 857	32
600 858	28
600 859	26
600 860	14
600 861	1
600 862	9
600 863	8
600 864	8
600 865	8
600 866	13
600 867	30
600 868	14
600 869	13
600 870	16
600 871	8
600 872	17
600 873	25
600 874	20
600 875	8
600 876	14
600 878	2
600 879	25

AD No.	Div.
600 320	7
600 321	25
600 322	25
600 323	16
600 324	27
600 325	25
600 326	1
600 327	17
600 328	25
600 329	25
600 330	26
600 331	30
600 332	8
600 333	16
600 334	4
600 335	31
600 336	31
600 337	15
600 338	8
600 339	14
600 340	14
600 341	22
600 342	16
600 343	16
600 344	9
600 345	30
600 346	30
600 355	8
600 356	7
600 357	1
600 358	20
600 359	1
600 360	1
600 361	31
600 362	8
600 363	17
600 364	8
600 365	7
600 366	8
600 367	2
600 368	2
600 369	2
600 370	14
600 371	20
600 372	2
600 373	15
600 374	25
600 375	17
600 376	22
600 377	6
600 378	22
600 379	30
600 380	16
600 381	16
600 382	8
600 383	17
600 384	8
600 385	8
600 386	20
600 387	1
600 388	2
600 389	25
600 390	30
600 391	17
600 392	20
600 393	15
600 394	32
600 395	7
600 396	4
600 397	14
600 398	14
600 399	14
600 400	2
600 401	9
600 402	16
600 403	17
600 404	17
600 405	8
600 406	16
600 407	2
600 408	16
600 409	1
600 410	2
600 411	8
600 412	30
600 413	25
600 414	14
600 415	14
600 416	14
600 417	12
600 418	12
600 419	25
600 420	27
600 421	15
600 422	9
600 423	4
600 424	16
600 425	7
600 426	12
600 427	17
600 428	4
600 429	6
600 430	25
600 431	4
600 432	14
600 433	1
600 434	8
600 435	16
600 436	4
600 437	4
600 438	26
600 439	4
600 440	27
600 441	26
600 442	4
600 443	6
600 444	15
600 445	22
600 446	16
600 447	20
600 448	2
600 449	8
600 450	18
600 451	1
600 452	25
600 453	32
600 454	25
600 455	9
600 456	25
600 457	17
600 458	15
600 459	9
600 460	8
600 461	8
600 463	2
600 464	4
600 465	6
600 466	14
600 467	16
600 468	15
600 469	25
600 470	1
600 471	15
600 472	2
600 473	25
600 474	16
600 476	9
600 480	25
600 481	16
600 482	1
600 483	2
600 484	16
600 485	22
600 486	8
600 487	27
600 488	12
600 489	20
600 490	16
600 491	9
600 492	25
600 493	20
600 494	16
600 495	16
600 496	25
600 497	25
600 498	9
600 499	9
600 500	1
600 501	15
600 502	9
600 503	16
600 504	23
600 505	23
600 506	27
600 507	4
600 508	2
600 509	5
600 510	8
600 511	13
600 512	16
600 513	1
600 514	14
600 515	17
600 516	22
600 517	8
600 518	1
600 519	25
600 520	17
600 521	8
600 522	8
600 523	10
600 524	9
600 525	2
600 526	25
600 527	18
600 528	29
600 529	14
600 530	8
600 531	25
600 532	16
600 533	16
600 534	15
600 535	25
600 537	22
600 538	6
600 539	8
600 540	9
600 541	4
600 542	25
600 543	8
600 544	12
600 545	6
600 546	15
600 547	8
600 548	16
600 549	16
600 550	16
600 551	16
600 552	14
600 553	15
600 554	16
600 555	8
600 556	16
600 557	8
600 558	22
600 559	8
600 560	14
600 561	26
600 562	26
600 563	17
600 564	30
600 565	14
600 566	15
600 567	1
600 568	14
600 569	16
600 570	19
600 571	19
600 572	19
600 573	16
600 574	9
600 575	2
600 576	12
600 577	1
600 578	8
600 579	17
600 580	16
600 581	16
600 582	7
600 583	20
600 584	14
600 585	28
600 586	25
600 587	30
600 588	14
600 589	8
600 590	9
600 591	9
600 592	9
600 593	27
600 594	16
600 595	8
600 597	17
600 598	2
600 599	6
600 600	15
600 601	12
600 602	20
600 603	10
600 604	8
600 605	20
600 606	16
600 607	25
600 608	27
600 609	27
600 610	16
600 611	16
600 612	14
600 613	16
600 614	25
600 615	8
600 616	30
600 617	25
600 618	28
600 619	13
600 620	2
600 621	12
600 622	10
600 623	4
600 624	16
600 625	1
600 626	12
600 627	9
600 628	9
600 629	4
600 630	9
600 631	14
600 632	9
600 633	8
600 634	12
600 635	12
600 636	12
600 637	12
600 638	12
600 639	25
600 640	12
600 641	16
600 642	18
600 643	17
600 644	14
600 645	8
600 646	28
600 647	28
600 648	28
600 649	28
600 650	25
600 651	8
600 652	8
600 653	28
600 654	14
600 655	22
600 656	12
600 657	26
600 658	7
600 659	25
600 660	6
600 661	22
600 662	7
600 663	9
600 664	2
600 665	22
600 666	8
600 667	9
600 668	22

Number	Page
NAVWEPS-17-20QT-05	21
NAVWEPS-17-20QT-07	20
NLCO-905	36
NOL-MDM-42	34
NOLTR-63-219	31
NOLTR-63-244	24
NOLTR-63-249	31
NOLTR-63-261	34
NOLTR-63-266	23
NRCC-6709	33
NRCC-6745	16
NRCC-6758	27
NRCC-6761	32
NRCC-6769	33
NRCC-7328	26
NRCC-7353	16
NRCC-7458	27
NRCC-7472	35
NRCC-7479	33
NRCC-7522	32
NRCC-7525	35
NRCC-7558	33
NRCC-7577	16
NRCC-7633	33
NRCC-7666	36
NRCC-7775	25
NRCC-7778	16
NRCC-ERB-635	22
NRCC-LR-320	32
NRCC-LR-324	33
NRCC-LR-327	33
NRCC-LR-333	16
NRCC-LR-377	32
NRCC-LR-378	33
NRCC-LR-383	33
NRCC-LR-385	33
NRCC-LR-390	16
NRCC-MB-252	35
NRCC-MB-253	35
NRCC-ME-213	26
NRCC-MET-399	16
NRCC-MH-102	16
NRCC-MP-23	27
NRCC-MP-27	27
NRCC-MS-108	36
NRCC-MT-50	25
NRL-5993	45
NRL-6086	36
NYO-2181-1	11
NYO-10025	38
NYO-10174	39
NYO-10434	41
NYO-10435	41
NYO-10436	41
NYO-10604	11
ORINS-43	11
ORINS-44	38
ORNL-3479	38
ORNL-3495	18
ORNL-3499(Vol. II)	38
ORNL-3516	13
ORNL-3518	38
ORNL-3524	13
ORNL-3528	13
ORNL-3533	38
ORNL-3540	39
ORNL-3598	13
ORNL-3599	38
OSW-PR-100	19
OSW-PR-101	18
OSW-PR-102	18
OSW-PR-104	14
OSW-PR-105	18
OSW-PR-106	19
OSW-PR-107	18
OSW-PR-108	19
OSW Spec-212	18
OTS-SB-401, Suppl. 1	37
OTS SB-514 Revised	16
OTS-SB-524	28
P-2829	30
PB-155 639 suppl.	18
PB-158 613 suppl.	18
PB-159 608	
see AD-270 622	43
PB-159 856	
see AD-279 581	16
PB-159 922	
see AD-280 048	32
PB-160 030	
see AD-280 874	33
PB-165 307	18
PB-165 322	21
PB-165 323	21
PB-165 324	20
PB-165 325	45
PB-165 327	44
PB-165 345	34
PB-165 346	34
PB-165 347	34
PB-165 882	9
PB-165 884	12
PB-165 885	3
PB-165 889	6
PB-165 890	8
PB-165 894	3
PB-165 896	11
PB-165 897	6
PB-165 898	7
PB-165 899	12
PB-165 900	7
PB-165 903	10
PB-165 904	8
PB-165 905	2
PB-165 910	5
PB-165 911	5
PB-165 919	6
PB-165 920	9
PB-165 923	7
PB-165 931	7
PB-165 934	5
PB-165,938	4
PB-165 939	4
PB-165 941	10
PB-165 942	12
PB-165 943	9
PB-165 944	12
PB-165 945	1
PB-165 949	10
PB-165 950	10
PB-165 951	12
PB-165 953	8
PB-165 954	4
PB-165 955	11
PB-165 958	6
PB-165 960	5
PB-165 962	3
PB-165 963	20
PB-165 964	3
PB-165 965	15
PB-165 966	28
PB-165 967	15
PB-165 968	29
PB-165 969	29
PB-165 970	28
PB-165 971	34
PB-165 972	46
PB-166 001	8
PB-166 002	2
PB-166 003	2
PB-166 004	4
PB-166 005	11
PB-166 006	7
PB-166 007	30
PB-166 008	46
PB-166 009	
see AD-279 325	31
PB-166 011	22
PB-166 012	26
PB-166 015	22
PB-166 016	24
PB-166 017	24
PB-166 018	42
PB-166 019	24
PB-166 020	23
PB-166 021	45
PB-166 022	26
PB-166 023	43
PB-166 024	20
PB-166 025	1
PB-166 026	5
PB-166 027	27
PB-166 029	27
PB-166 030	25
PB-166 031	44
PB-166 032	17
PB-166 033	17
PB-166 034	17
PB-166 035	17
PB-166 036	26
PB-166 037	15
PB-166 038	30
PB-171 809-6	23
PB-181 563	47
PB-181 679	45
PB-181 680	18
PB-181 681	19
PB-181 682	19
PB-181 683	19
PB-181 684	18
PB-181 685	14
PB-181 686	18
PB-181 687	18
PB-181 688	21
PB-181 689	20
PB-181 690	20
PB-181 691	21
PB-181 692	21
PB-181 693	20
PWAC-412	41
PWAC-416	41
PWAC-424	41
PWAC-427	39
R63SD102	34
RAD-TR-64-8	15
RADC-TDR-62-611, v. 1	46
RADC-TDR-63-280	46
Rocket-R-5135	24
ROM-3181-1001	24
SAM-21-02-103, R-1	5
SAM-59-48	10
SAM-59-59	10
SAM-59-71	12
SAM-59-82	8
SAM-59-85	4
SAM-59-87	11
SAM-59-91	6
SAM-59-97	7
SAM-60-8	4
SAM-60-12	11
SAM-60-21	10
SAM-60-25	4
SAM-60-33	12
SAM-60-36	12
SAM-60-37	9
SAM-60-39	1
SAM-60-50	7
SAM-60-70	11
SAM-60-76	5
SAM-61-4	8
SAM-61-6	6
SAM-61-9	2
SAM-61-18	7
SAM-61-20	5
SAM-61-21	5
SAM-61-49	6
SAM-61-52	9
SAM-61-64	8
SAM-62-24	5
SAM-AR-2-63	9
SAM-TDR-62-49	7
SAM-TDR-63-2	12
SAM-TDR-63-14	3
SAM-TDR-63-45	6
SAM-TDR-63-47	8
SAM-TDR-63-70	3
SAM-TDR-63-73	7
SAM-TDR-63-82	12
SAM-TDR-63-94	9
SAN-61-2	10
SC-R-64-124	28
SDC-TM-758/000/00	47
SDC-TM-1763	
Seal-shell-2	29
SIT(DL)710	26
SLAC-26	39
SLAC-27	39
Squid-BRN-10-P	43
Squid-BRN-12-P	14
SRI-899, FR	25
STR-2-1	24
STR-3-1	24
STR-4-2	24
STR-6-15	42
STR-10-1(Excepts)	15
STR-AMP-3	23
SwRI-830-2	20
TID-3098(Bks 1, 2 & Index)	10
TID-3522(7th Rev.)	39
TID-3577	35
TID-7669	39
TID-7671	39
TID-7677	15
TID-18285	25
TID-19562	2
TID-19969	25
UCRL-11077	38
UCRL-11184	11
UCRL-11215	2
UCRL-11229	43
UCRL-11238	38
UCRL-11371	38
UR-641	11
USBM-U-1109	37
USNRDL-TR-461	45
UTIAS-76	31
UTIAS-96	35
UTIAS-R-18	32
UTIAS-TN-54	31
VPT-10G	20
WADC-TN-55-311	27
WADC-TR-52-79, pt. 1	1
WAPD-244	40
WAPD-275	35
WAPD-283	36
WAPD-MRP-107	40
WAPD-TM-377	29
WAPD-TM-398	29
WAPD-TM-407	29
WASH-1046	
EANDC(US)-50 "U"	37
WT-722	30
Y-1455	37

NUMBER INDEX

Number	Page
AAL-TN-63-2	4
ABL/X-47	27
ACLI-OMS-557	23
AD-204 073	34
AD-204 074	34
AD-212 773	45
AD-217 965	43
AD-218 076	3
AD-220 543	28
AD-223 448	17
AD-223 449	17
AD-223 450	17
AD-223 451	17
AD-226 824	8
AD-227 436	3
AD-228 803	10
AD-228 804	4
AD-228 805	10
AD-228 806	11
AD-229 279	22
AD-229 504	6
AD-229 898	7
AD-230 634	12
AD-231 546	4
AD-231 619	10
AD-233 169	4
AD-235 227	12
AD-235 228	1
AD-237 240	12
AD-237 241	9
AD-247 164	5
AD-249 485	45
AD-250 041	7
AD-250 858	27
AD-250 981	11
AD-250 984	8
AD-253 003	2
AD-253 006	7
AD-253 007	5
AD-253 008	8
AD-254 749	10
AD-254 750	5
AD-254 753	9
AD-266 429	23
AD-270 622	43
AD-272 653	19
AD-272 863	22
AD-277 791	26
AD-278 175	36
AD-279 325	31
AD-279 581	16
AD-279 634	31
AD-280 048	32
AD-280 529	33
AD-280 640	27
AD-280 874	33
AD-288 580	47
AD-299 384	46
AD-405 145	44
AD-405 517	44
AD-409 607	46
AD-410 346	16
AD-413 829	33
AD-414 730	27
AD-416 485	32
AD-417 969	33
AD-418 111	35
AD-418 237	35
AD-418 249	16
AD-418 644	24
AD-420 569	26
AD-420 983	41
AD-422 116	37
AD-423 662	33
AD-425 027	30
AD-425 627	17
AD-425 712	17
AD-426 311	45
AD-426 852	25
AD-428 087 repriced	28
AD-428 236	16
AD-428 843 repriced	31
AD-428 856 repriced	31
AD-429 500	14
AD-429 501	43
AD-429 502	43
AD-429 782	36
AD-430 123	9
AD-430 646	1
AD-430 776 repriced	34
AD-431 013 repriced	14
AD-431 785 repriced	24
AD-432 317	36
AD-433 237	2
AD-433 613	32
AD-433 830	47
AD-434 083	4
AD-434 544 repriced	36
AD-434 675 repriced	42
AD-434 821 repriced	23
AD-437 257 repriced	42
AD-438 916	35
AeroChem-TM-18	44
AFCRL-E5062	20
AFOSR-1865	31
AFOSR-2147	31
AFOSR-TN-60-331	44
AFOSR-TR-58-135, pt. 1	34
AFOSR-TR-58-135, pt. 2	34
AFOSR-TR-58-135, pt. 3	34
AMRL-236	3
AMRL-390	3
AMRL-TDR-63-126	2
AN/ASM-103	20
AN/ASM-104	21
AN/ASM-106	21
AN/ASM-108	21
AN/ASM-141	20
ANL-5896	18
ANL-6654	29
ANL-6814	37
ANL-6817	13
ANL-6818	18
ANL-6850	39
APDA-156	40
APED-4236	41
APEX-603(Del.)	40
APL-TDR-64-34	36
ARL-63-170	26
ARPA SD-97	47
ASD-TDR-62-740	30
ASD-TDR-62-833, pt. 2	14
ASD-TDR-63-664, v. 3	28
ASD-TDR-63-727	41
ASRPA-625	44
ATI-71 463	5
ATI-112 473	20
ATI-164 224	1
BATT-4673, final	15
BMI-4673-T7	15
BNL-828(T-323)	11
BNL-838(T-329)	40
BNL-855 (PR-7)	25
BNL-PR-7	25
BuMed-MR005. 13-6001, R-87	3
BWRA-C59/8/62-B2/32/62/	36
C-4298/ASW-20	21
Clevite-20	21
Clevite-21	21
CS-4	28
DASA-1182	20
DASA-1192	45
DASA-1237	19
DP-871	13
DP-874	38
DP-877	38
EFINS-64-14	14
EURAEC-594	37
FAA Task 150-004-00S	17
FAA Task 150-004-00S	17
FTC-TDR-63-22	20
GA-4828	37
GEAP-4089 (Vols. I&II)	37
GEAP-4203	40
GEAP-4351	40
GEAP-4400	41
Grant NIH-H-2127	29
Grant NIH-HE-07696	29
Grant NSF-C255	15
Grant NSF-G-19284	15
Grant NSF-G-24488, NSF-2	46
HASL-141	29
HW-73381(Sup 1)	38
HW-74949	37
HW-78080	40
HW-78724	44
HW-81169	40
IBM 704	44
IBM 7090	29
IDO-11006	13
IDO-16871-2	40
IDO-16908	40
IDO-16948	40
IDO-16961	41
IDO-16965	39
IDO-28621	39
IS-667	13
IS-780	13
IS-833	29
IST-2144-268-T	45
IST BRR-1	29
IST BRR-Z	29
JPL-TR-32-482	1
K-1589	39
K-1594	18
KY-452	13
KY-453	13
LA-3007	28
LA-3043	30
LA-3056	42
LADC-1463	38
LB-31023	30
LL-TR-295	44
M-157 Trucks (8-Ton)	26
MAC-8938	26
MATT-238	42
MCW-1454	18
ML-TDR-64-75	42
N62-10771	31
N63-15846	9
N63-15902	24
N63-19496	37
N63-21201	6
N63-22664	3
N63-23105	26
N63-23372	8
N64-11314	39
N64-12385	17
N64-12531	38
N64-12870	41
N64-12928	44
N64-14067	33
N64-14084	25
N64-14203	16
N64-14425	37
N64-14539	29
N64-14737	16
N64-15178	29
N64-15520	31
N64-15744	9
N64-15762	43
N64-16070	34
N64-16096	14
N64-16115	37
N64-16200	36
N64-16552	13
N64-16554	2
N64-16608	14
N64-16672	13
N64-16693	40
N64-16944	42
N64-16945	11
N64-17528	15
N64-17574	14
N64-17718	41
N64-17719	41
N64-17720	41
N64-17732	39
N64-17789	14
N64-17988	44
N64-18077	23
N64-18142	39
N64-18217	1
N64-18279	37
N64-18291	39
N64-18293	15
N64-18294	15
N64-18413	38
N64-18416	42
N64-18421	3
N64-18424	28
N64-18434	1
N64-18437	14
N64-18458	35
N64-18467	34
N64-18935	36
N64-18954	45
N64-18995	43
N64-19003	13
N64-19015	2
N64-19018	30
N64-19035	10
N64-19036	10
N64-19074	13
N64-19099	29
N64-19168	1
N64-19223	22
N64-19227	23
N64-19235	32
N64-19236	10
N64-19237	38
N64-19291	42
N64-19292	23
N64-19293	25
N64-19322	32
N64-19477	25
N64-19478	32
N64-19483	22
NAA-SR-6387	40
NAA-SR-7020	40
NAA-SR-7465	35
NAA-SR-8262	35
NAA-SR-8381	18
NAA-SR-8684	37
NAA-SR-9190	29
NAS-NRC-SCA-2	17
NAS-NRC-SCA-3	17
NAS-NRC-SCA-4	17
NAS-NRC-SCA-5	17
NASA-CR-26	44
NASA-CR-53231	14
NASA-CR-53342	14
NASA-CR-53389	39
NASA-CR-53530	1
NASA-CR-53562	28
NASA-CR-53584	14
NASA-CR-53588	1
NASA-CR-53618	3
NASA-CR-54001	37
NASA-CR-54017	15
NASA-CR-54018	15
NASA-CR-54031	22
NASA Order R-47	3
NASA Order R-80	42
NASA-SP-3008	42
NASA-SP-5007	2
NASA-TN-D-2053	23
NASA-TN-D-2071	45
NASA-TN-D-2172	25
NASA-TN-D-2173	22
NASA-TN-D-2270	23
NASA-TN-D-2279	42
NASA-TN-D-2281	25
NASA-TN-D-2282	32
NASA-TN-D-2283	32
NASA-TN-D-2301	1
NASA-TR-R-155	23
NASA-TR-R-171	32
NAVWEPS-17-20QK-01	21
NAVWEPS-17-20QT-02	20
NAVWEPS-17-20QT-03	20
NAVWEPS-17-20QT-04	21

Subject	Page	Number
Explosives initiators	S-23	AD-434 821
	S-24	AD-431 785
Extensometers	S-16	AD-418 249
Fast reactors	S-40	APDA-156
Fatigue (Mechanical)	S-31	AD-279 325
	S-36	AD-429 782
Fevers	S-5	PB-165 960
	S-6	PB-165 919
Filaments	S-22	NASA-TN-D-2173
Finishes and finishing	S-26	AD-277 791
Finite Differences	S-34	AD-430 776
Fins	S-32	AD-416 485
Fire-protective clothing	S-5	PB-166 026
Fires	S-5	PB-166 026
Firing circuits	S-24	AD-431 785
Fishes	S-25	TID-18285
		TID-19969
Fission products	S-38	ORNL-3518
Flashblindness	S-8	PB-165 890
Flight control systems	S-20	PB-181 690
		PB-181 693
Flight simulators	S-2	PB-165 905
	S-16	AD-428 236
Flow visualization	S-33	AD-423 662
Fluid flow	S-34	PB-165 345
		PB-165 346
Fluids	S-34	PB-165 971
Fluorescent screens	S-43	AD-270 622
Flutter	S-32	AD-280 048
		AD-416 485
Food	S-25	TID-18285
		TID-19969
Fuel cells	S-22	AD-272 863
		N64-19223
Fused materials	S-13	IS-667
Galvanic skin response	S-3	PB-165 894
Gas flow	S-32	NASA-TR-R-171
	S-33	AD-280 874
Gas ionization	S-42	NASA-TN-D-2279
Gas turbines	S-25	AD-426 852
Genetics	S-11	PB-165 955
	S-12	PB-165 942
Geophysics	S-15	PB-165 967
Glomerulus apparatus	S-5	PB-165 960
Glucose	S-10	PB-165 949
Glutamic acid	S-10	PB-165 949
Glutamic oxalacetic transaminase	S-72	PB-165 951
Glutamine	S-10	PB-165 949
Glycerides	S-3	PB-165 964
Glycerols	S-3	PB-165 964
Grammar	S-46	PB-166 008
Greases	S-27	PB-166 027
Guanidines	S-9	PB-165 920
	S-10	PB-165 903
Guided missiles	S-23	PB-171 809-6
Guided missiles (Surface-to-surface)	S-24	AD-418 644
Hazards	S-27	PB-166 029
Health physics	S-15	TID-7677
Hearing	S-4	PB-165 954
	S-5	PB-165 911
	S-7	PB-165 931
Heart	S-2	NASA-SP-5007
Heat	S-5	PB-166 026
Heat exchangers	S-36	AD-434 544
Heat transfer	S-14	AD-431 013
	S-39	TID-7669
	S-44	NASA-CR-26
Hemoglobin	S-4	PB-165 938
	S-12	PB-165 942
High altitude	S-4	PB-165 938
		PB-165 939
Hoists	S-26	PB-166 036
Hot trapping	S-36	AD-434 544
Hughson-Westlake method	S-6	PB-165 958
Hulls (Marine	S-35	AD-418 111
HY-80 steel	S-36	AD-432 317
Hydraulic brakes	S-27	AD-280 640
Hydrodynamic configurations	S-35	AD-418 111
Hydrogen	S-14	AD-431 013
	S-25	NASA-TN-D-2281
	S-35	WAPD-275
	S-37	N64-18279
	S-43	AD-429 501
		AD-429 502
Hydrogen deuteride	S-43	AD-429 501
17-Hydroxycorticosteroids	S-10	PB-165 941
	S-12	PB-165 884
Hypersonic characteristics	S-32	NASA-TN-D-2283
Hypersonic flow	S-33	AD-280 529
Hypothermia	S-3	PB-165 885
IBM 7090	S-29	PB-165 968
Ignition	S-42	AD-437 257
Indexes	S-2	PB-166 002
Industrial plants	S-18	PB-165 307
		PB-181 680
Infectious hepatitis	S-8	PB-166 001
Information retrieval	S-46	PB-165 972
	S-47	AD-433 830
Infrared radiation	S-45	PB-165 325
Infrared spectroscopy	S-27	PB-166 027
Instruction manuals	S-46	AD-299 384
Integral equations	S-22	PB-166 015
	S-28	PB-165 966
Intermediate frequency transformers	S-21	PB-165 322
		PB-165 323
Ion sources	S-22	NASA-TN-D-2173
	S-42	AD-434 675
Iproniazid	S-10	PB-165 949
Iron alloys	S-36	AD-278 175
Job analysis	S-16	OTS SB-514 Revised
α-Ketoglutaric acid	S-10	PB-165 949
Kidney function tests	S-5	PB-165 960
Kidneys	S-6	PB-165 919
Laboratories	S-38	ORNL-3479
Lactate dehydrogenase	S-10	PB-165 950
Lactic acid	S-10	PB-165 949
Laminar boundary layer	S-34	AD-430 776
		PB-165 971
Laminar flow	S-33	AD-413 829
Landing gear	S-16	AD-279 581
Language	S-46	AD-299 384
		PB-166 008
	S-47	AD-288 580
Lasers	S-41	AD-420 983
Learning machines	S-28	AD-428 087
Lenticular aerodyne	S-34	PB-165 347
Leukemia	S-11	ORINS-43
Life support	S-2	AD-433 237
Light communication systems	S-41	AD-420 983
Lipids	S-6	PB-165 889
Liquefied gases	S-14	AD-431 013
	S-27	AD-414 730
Liquid metals	S-15	N64-18294
	S-36	AD-434 544
Liquid rocket propellants	S-27	AD-414 730
Lithium	S-36	AD-434 544
Liver	S-9	PB-165 882
Loading (Mechanics)	S-31	AD-279 325
Loess soil	S-19	AD-272 653
Low temperature research	S-23	PB-171 809-6
Lubricants	S-26	AD-277 791
	S-27	AD-280 640
Luminescent	S-43	AD-270 622
MA-3 Propulsion systems	S-24	AD-418 644
Machine translation	S-45	PB-166 021
	S-46	AD-409 607
	S-47	AD-288 580
MACON (Airship)	S-17	PB-166 033
Macula butea	S-8	PB-165 890
Magnesium oxide	S-26	AD-420 569
Magnetic fields	S-14	N64-17574
		N64-17789
Magnetic materials	S-44	AD-405 517
Mammals	S-2	TID-19562
Management engineering	S-30	AD-425 027
Maraging steels	S-36	AD-432 317
Marine engineering	S-16	AD-410 346
Martensite	S-36	AD-278 175
Mass spectroscopy	S-13	ORNL-3528
Materials	S-26	AD-277 791
Matrix algebra	S-30	PB-166 038
Maxwellian fluid	S-34	PB-165 971
Medical equipment	S-6	PB-165 889
	S-7	PB-168 900
Medical examination	S-6	PB-165 889
Membranes	S-22	AD-272 863
2-Mercaptoethyl guanidine	S-9	PB-165 920
	S-10	PB-165 903
Mercuric chloride	S-10	PB-165 950
Mercury (Planet)	S-1	PB-165 945
Metabolism	S-5	PB-165 934
	S-9	PB-165 920
	S-10	PB-165 949
Metals	S-26	AD-277 791
Meteors	S-23	NASA-TN-D-2270
Methane	S-43	AD-429 502
Michigan project	S-45	PB-166 021
Microwave amplifiers	S-20	PB-165 963
Military publications	S-2	PB-166 002
		PB-166 003
	S-46	AD-299 384
Military tactics	S-24	PB-166 019
Miniature electronic equipment	S-21	PB-165 322
		PB-165 323
Model basins	S-35	AD-418 237
Molybdenum alloys	S-37	AD-422 116
Monitors	S-21	PB-181 688
Monotype PSV systems	S-28	AD-428 087
Monte Carlo method	S-29	WAPD-TM-407
Moon	S-1	N64-18434
Muscles	S-5	PB-165 910
Naval Research	S-47	PB-181 563
Netherlands	S-45	PB-181 679
Neurotrons	S-28	AD-428 087
Neutron cross sections	S-37	N64-18279
Neutron transport theory	S-29	WAPD-TM-377
Neutrons	S-29	WAPD-TM-407
	S-38	ORNL-3499 (Vol. II)
Niobium alloys	S-37	AD-422 116
Noise	S-4	PB-165 954
	S-5	PB-165 911
Nonlinear differential equations	S-1	N64-18217
	S-28	N64-18424
Nozzles	S-34	PB-165 346
Nuclear explosions damage	S-30	PB-166 007
Nuclear explosions	S-39	TID-3522 (7th Rev.)
	S-45	PB-165 325
Nuclear reactors	S-39	TID-7669
Numerical methods and procedures	S-28	PB-165 970
Nystagmus	S-3	N64-18421
Operations research	S-30	AD-425 027
Operators (Mathematics)	S-28	PB-165 970
Operators (Personnel)	S-2	PB-165 905
Optical equipment	S-41	AD-420 983
Ordnance	S-23	AD-266 429
	S-24	PB-166 016
		PB-166 017
Organic compounds	S-38	NYO-10025
Orthohydrogen	S-14	AD-431 013
Oscillation	S-28	N64-18424
Oxalacetic acid	S-10	PB-165 949
Oxides	S-26	AD-420 569
Oxidoreductases	S-10	PB-165 950

SUBJECT INDEX

Subject	Page	Number
Abstracts	S-46	PB-165 972
Acceleration tolerance	S-3	PB-165 962
Acclimatization	S-4	PB-165 938
		PB-165 939
Acetates	S-10	PB-165 949
Acoustics	S-31	AD-279 034
Adrenocorticotripic hormone	S-10	PB-165 941
Aerodynamic characteristics	S-16	AD-428 236
Aerodynamic control surfaces	S-16	AD-428 236
Aerosols	S-42	PB-437 257
Aerotitis	S-8	PB-165 904
AET	S-10	PB-165 903
Air	S-14	AD-429 500
Air force personnel	S-5	PB-165 911
Air traffic	S-17	AD-425 627
		AD-425 712
Aircraft	S-34	PB-165 347
Airplane engine oils	S-27	PB-166 027
Airships	S-17	PB-166 032
		PB-166 033
		PB-166 034
		PB-166 035
Airship envelopes	S-17	PB-166 034
Alanine	S-10	PB-165 949
Aldehyde-lyases	S-10	PB-165 950
Altimeters	S-20	PB-181 693
Aluminum	S-35	TID-3577
Aluminum alloys	S-36	AD-429 782
Aluminum oxide	S-26	AD-420 568
Amines	S-13	ORNL-3516
Amino acids	S-10	PB-165 949
Amphibious vehicles	S-26	PB-166 022
Anesthesia	S-3	PB-165 885
Antarctic regions	S-15	PB-165 967
		PB-166 037
Aorta	S-4	AD-434 083
Applied mathematics	S-23	PB-166 020
Arc welding	S-37	AD-422 116
Artificial intelligence	S-28	AD-428 087
Aspartic acid	S-10	PB-165 949
Astronomical data	S-1	NASA-TN-D-2301
Atherosclerosis	S-9	PB-165 943
Atlas	S-24	AD-418 644
Atmospheric sounding	S-15	PB-166 037
Atomic energy levels	S-44	AD-405 145
Audiometry	S-6	PB-165 958
	S-7	PB-165 931
Auditory acuity	S-6	PB-165 958
Auditory perception	S-4	PB-166 004
Auditory signals	S-4	PB-166 004
Automata	S-28	AD-428 087
Automatic pilots	S-20	PB-181 689
Aviation accidents	S-17	PB-166 033
Aviation medicine	S-2	PB-166 002
		PB-166 003
Axially symmetric flow	S-34	AD-430 776
AZ80 Mg alloys	S-16	AD-279 581
AZ91C Mg alloys	S-16	AD-279 581
B-6 alloys	S-37	AD-422 116
Backward masking	S-4	PB-166 004
Band-pass filters	S-21	PB-165 322
		PB-165 323
Barbiturates	S-10	PB-165 949
Barges	S-16	AD-410 346
Beaches	S-35	AD-418 237
Behavior	S-2	PB-165 905
	S-12	PB-165 944
Beksy-type audiometry	S-7	PB-165 931
Bibliographies	S-2	AD-433 237
		PB-166 003
	S-13	ORNL-3516
	S-16	OTS SB-514 Rev.
	S-22	PB-166 011
	S-28	OTS SB-524
	S-35	TID-3577
	S-37	OTS SB-401, Suppl. 1
	S-39	TID-3522 (7th Rev.)
Biological contamination	S-7	PPB-165 898
Biophysics	S-29	PB-165 968
	S-29	PB-165 969
Biphenyl	S-13	IDO-11006
Bipropellants	S-27	AD-414 730
Bis(2-guanidoethyl) disulfide	S-9	PB-165 920
	S-10	PB-165 903
Blackout (Physiology)	S-6	PB-165 897
	S-4	PB-165 939
Blast	S-20	PB-165 324
	S-30	PB-166 007
Blood analysis	S-12	PB-165 899
Blood chemistry	S-3	PB-165 964
Blood circulation	S-9	PB-165 943
Blood plasma	S-3	PB-165 885
		PB-165 964
	S-6	PB-165 919
Blood serum	S-10	PB-165 941
Blood volume	S-5	PB-165 960
Blunt bodies	S-33	AD-280 529
Bodies of revolution	S-32	NASA-TN-D-2282
Body temperature	S-6	PB-165 919
Boiling water reactors	S-40	GEAP-4203
	S-41	GEAP-4400
Boltzmann's equation	S-32	AD-433 613
Bombing	S-23	PB-166 020
Bose-Chaudhuri codes	S-45	AD-426 311
Boundary value problem	S-22	PB-166 015
	S-28	PB-165 970
Buckling (Mechanics)	S-30	PB-166 038
Burns	S-5	PB-166 026
Calcium oxide	S-26	AD-420 569
Calcium sulfates	S-14	PB-181 685
Calibration	S-16	AD-418 249
Cancer	S-11	ORINS-43
Cannulation	S-4	AD-434 083
Carbon monoxide	S-43	AD-429 502
Carbon tetrachloride	S-9	PB-165 882
	S-10	PB-165 950
Cardiovascular system	S-9	AD-430 123
Cargo	S-26	PB-166 036
Cargo vehicles	S-26	PB-166 036
Castings	S-16	AD-279 581
Catalysts	S-14	AD-431 013
Cavity resonators	S-21	PB-165 322
		PB-165 323
Celestial mechanics	S-1	N64-18217
Ceric oxide	S-26	AD-420 569
Cesium	S-15	N64-18294
CEVM steels	S-36	AD-432 317
Chemical elements	S-13	ORNL-3528
Chemical warfare agents	S-42	AD-437 257
Chimera	S-11	PB-165 955
	S-12	PB-165 942
Chimpanzees	S-8	PB-166 001
Chlorpromazine	S-10	PB-165 949
Classification	S-47	AD-433 830
CNS depressants	S-10	PB-165 949
CNS stimulants	S-10	PB-165 949
Coanda effect	S-34	PB-165 345
		PB-165 346
		PB-165 347
Coding	S-45	AD-426 311
Cold trapping	S-36	AD-434 544
Combustion products	S-42	AD-437 257
COMIT	S-46	AD-409 607
Compressible flow	S-33	AD-280 874
Computer logic	S-28	AD-428 087
Computers	S-47	AD-288 580
Communication theory	S-45	AD-426 311
	S-28	AD-428 087
		PB-165 966
Conferences	S-15	TID-7677
	S-37	GEAP-4089 (Vols. I&II)
	S-39	TID-7669
Conical bodies	S-32	NASA-TN-D-2283
Conveyors	S-26	PB-166 036
Cooling	S-44	PB-166 031
Corrosion	S-37	OTS-SB-401, Suppl. 1
Corticosteroid agents	S-10	PB-165 941
	S-12	PB-165 884
Cosmic rays	S-11	PB-166 005
Cryogenics	S-14	AD-431 013
	S-23	PB-171 809-6
Cues (Stimuli)	S-1	PB-166 025
Culture media	S-8	PB-165 953
Cybernetics	S-28	AD-428 087
Cylindrical bodies	S-30	PB-166 007
	S-31	AD-279 634
Data processing systems	S-30	AD-425 027
	S-46	PB-165 972
Decision making	S-28	AD-428 087
Decision tables	S-30	AD-425 027
Decision theory	S-30	AD-425 027
Decompression sickness	S-9	AD-430 123
Dental fillings	S-7	PB-166 006
Dentistry	S-2	PB-166 003
	S-12	PB-165 884
		PB-165 899
Desalination	S-18	PB-165 307
		PB-181 680
		PB-181 684
		PB-181 686
		PB-181 687
	S-19	PB-181 681
		PB-181 682
		PB-181 683
Detectors	S-39	N64-18291
Detonations	S-42	AD-437 257
Detonators	S-23	AD-266 429
Deuterium	S-37	N64-18279
	S-43	AD-429 501
		AD-429 502
Diabetes	S-9	PB-165 943
Diet	S-7	PB-165 923
Disease vectors	S-8	PB-166 001
Distilling plants	S-18	PB-181 684
	S-19	PB-181 681
Documentation	S-47	AD-433 830
Doppler systems	S-25	PB-166 030
Dose rate	S-12	PB-165 944
Dosimeters	S-11	PB-166 005
Drag	S-35	AD-418 111
Ear	S-5	PB-165 910
Echo ranging	S-42	PB-166 018
Ecology	S-2	TID-19562
Electric connectors	S-23	AD-266 429
Electric primers	S-23	AD-434 821
Electric propulsion	S-25	NASA-TN-D-2172
		NASA-TN-D-2281
Electrical engineering	S-22	PB-166 011
Electrocardiography	S-7	PB-165 900
Electrodialysis	S-18	PB-165 307
		PB-181 680
Electroforming	S-26	AD-277 791
Electrolytes	S-22	AD-272 863
Electrolytes (Physiology)	S-3	PB-165 885
Electromagnetic waves	S-45	NASA-TN-D-2071
Electron multipliers		PB-181 691
		PB-181 692
Electronic equipment	S-7	PB-165 898
Electronics	S-22	PB-166 011
Electrons	S-42	NASA-SP-3008
Electrophoresis	S-11	PB-165 955
Electrostatic thrustors	S-25	NASA-TN-D-2172
Electrothermal propulsion	S-25	NASA-TN-D-2281
Embryos	S-2	NASA-SP-5007
English adjectives	S-46	PB-166 008
Enolase	S-10	PB-165 950
Enzymes	S-10	PB-165 950
	S-12	PB-165 951
Erythrocytes	S-12	PB-165 942
Ethanols	S-27	AD-414 730
Evaporators	S-18	PB-181 686
	S-19	PB-181 682
Exodontia	S-12	PB-165 884
		PB-165 899
Expanded plastics	S-28	OTS-SB-524
Exploding wires	S-24	AD-431 785
Explosion bubbles	S-35	AD-438 916
Explosion effects	S-24	PB-166 016
Explosive gases	S-42	AD-437 257

U.S. DEPARTMENT OF COMMERCE FIELD OFFICES

SERVE THE BUSINESS COMMUNITY

The Department of Commerce maintains Field Offices to enable the business community to avail itself locally of Government facilities designed to promote commerce. Working closely with various units in the Department and, when necessary, with other Government agencies, the Field Offices provide business services to manufacturers, wholesalers, retailers, trade publications, trade associations, advertising agencies, research groups, financial institutions, and exporters and importers.

Experienced personnel will gladly assist in the solution of specific problems, explain the scope and meaning of regulations administered by the Department, and provide practical assistance in the broad field of domestic and foreign commerce. Field Offices act as official sales agents of the Superintendent of Documents, and maintain an extensive business reference library containing periodicals, directories, publications and reports from official as well as private sources.

Among the many services which businessmen have found of value are:

GENERAL

- Management and business aids
- Establishing a new business

BASIC ECONOMIC DATA

- Census data with national and often State and regional breakdowns, on manufacturing wholesaling, retailing, service industries, employment and unemployment, population, housing, agriculture
- Basic records of national income and product, regional trends, balance of payments, foreign aid

MARKETING AND DISTRIBUTION

- Development and maintenance of markets
- Distribution channels, facilities and services
- Marketing and distribution statistics

PRODUCTION

- Modernization of plant processes and other technological aids
- Development of new products
- Government-owned patents for free license
- Commodity standards

FOREIGN TRADE AND INVESTMENT

- Tariff and exchange regulations
- Import and export quotas, licensing regulations
- Statistics on imports and exports
- Investment and trade opportunities abroad
- Economic conditions in foreign countries

COOPERATIVE OFFICES

To make the services of the Department of Commerce more widely available, agreements have been entered into with more than 750 Chambers of Commerce, Manufacturers Associations, and similar business groups under which these organizations have become official Cooperative Offices of the Department. If specific information is not on hand in the Cooperative Office, your problem will be referred to the nearest Departmental field office.

Department Field Offices

Albuquerque, N. Mex., 87101, U.S. Courthouse. 247-0311.
Anchorage, Alaska, 99501, Room 306, Loussac-Sogn Building. Phone: BR 2-9611.
Atlanta, Ga., 30303, 75 Forsyth St., N.W. JAckson 2-4121.
Birmingham, Ala., 35203, Title Bldg., 2030 Third Ave., North. Phone: 323-8011.
Boston, Mass., 02110, Room 230, 80 Federal Street. CApitol 3-2312.
Buffalo, N.Y., 14203, 504 Federal Building, 117 Ellicott St., TL 3-4216.
Charleston, S.C., 29401, No. 4 North Atlantic Wharf. Phone: 722-6551.
Charleston, W. Va., 25301, 3002 New Federal Office Bldg., 500 Quarrier St. Phone: 343-6196.
Cheyenne, Wyo., 82001, 207 Majestic Bldg., 16th & Capitol Ave. Phone: 634-2731.
Chicago, Ill., 60606, Room 1302, 226 West Jackson Blvd. 828-4400.
Cincinnati, Ohio, 45202, 809 Fifth Third Bank Bldg., 36 E. Fourth Street. 381-2200.
Cleveland, Ohio, 44101, 4th Floor, Federal Reserve Bank Bldg., East 6th St. & Superior Ave. 241-7900.
Dallas, Tex., 75202, Room 1200, 1114 Commerce St. RIverside 8-5611.
Denver, Colo., 80202, 142 New Custom House, 19th & Stout Street. 534-4151.
Detroit, Mich., 48226, 445 Federal Bldg. 226-6088.
Greensboro, N.C., 27402, Room 407, U.S. Post Office Bldg. 273-8234.
Hartford, Conn., 06103, 18 Asylum St. Phone: 244-3530.
Honolulu, Hawaii, 96813, 202 International Savings Bldg., 1022 Bethel St. Phone: 588874.
Houston, Tex., 77002, 5102 Federal Bldg., 515 Rusk Ave. CA 8-0611.
Jacksonville, Fla., 32202, 512 Greenleaf Building, 204 Laura Street. ELgin 4-7111.
Kansas City, Mo., 64106, Room 2011, 911 Walnut Street. BAltimore 1-7000.
Los Angeles, Calif., 90015, Room 450, Western Pacific Bldg., 1031 S. Broadway. 688-2830.
Memphis, Tenn., 38103, 345 Federal Office Bldg., 167 N. Main Street. Phone: 534-3214.
Miami, Fla., 33132, 408 Ainsley Bldg., 14 N.E. First Ave. FRanklin 7-2581.
Milwaukee, Wis., 53203, Straus Bldg., 238 W. Wisconsin Ave. Phone: BR 2-8600.
Minneapolis, Minn., 55401, Room 304, Federal Bldg., 110 South Fourth Street. Phone: 334-2133.
New Orleans, La., 70130, 1508 Masonic Temple Bldg., 333 St. Charles Avenue. Phone: 527-6546.
New York, N.Y., 10001, 61st Fl., Empire State Bldg., 350 Fifth Ave. LOngacre 3-3377.
Philadelphia, Pa., 19107, Jefferson Building, 1015 Chestnut Street. WAlnut 3-2400.
Phoenix, Ariz., 85025, New Federal Bldg., 230 N. First Avenue. Phone: 261-3285.
Pittsburgh, Pa., 15222, 1030 Park Bldg., 355 Fifth Avenue. 471-0800.
Portland, Oreg., 97204, 217 Old U.S. Courthouse, 520 S.W. Morrison Street. 226-3361.
Reno, Nev., 89502, 1479 Wells Avenue. Phone: FA 2-7133.
Richmond, Va., 23240, 2105 Federal Building, 400 North 8th Street. Phone: 649-3611.
St. Louis, Mo., 63103, 2511 Federal Building, 1520 Market Street. MAin 2-4243.
Salt Lake City, Utah, 84101, 222 S.W. Temple St. 524-5116.
San Francisco, Calif., 94111, Room 419, Customhouse, 555 Battery St. YUkon 6-3111.
Santurce, Puerto Rico, 00907, Room 628, 605 Condado Ave. Phone: 723-4640.
Savannah, Ga., 31402, 235 U.S. Courthouse and Post Office Bldg., 125-29 Bull Street. ADams 2-4755.
Seattle, Wash., 98104, 809 Federal Office Bldg., 909 First Avenue. MUtual 2-3300.

Subject	Page	Number
Oxygen consumption	S-5	PB-165 934
	S-10	PB 165 949
Panels (Structural)	S-30	PB-166 038
Paper	S-16	AD-410 346
Parahydrogen	S-14	AD-431 013
Parametric amplifiers	S-20	PB-165 963
Performance (Human)	S-16	OTS SB-514 Rev.
PETN	S-24	AD-431 785
Pfaff's method	S-1	NASA-TN-D-2301
Phosphorescent materials	S-43	AD-270 622
Physics	S-38	ORNL-3499 (Vol. II)
Pilots	S-6	PB-165 897
Planetary atmospheres	S-1	PB-165 945
Plasma physics	S-32	AD-433 613
	S-45	NASA-TN-D-2071
Plastics	S-26	AD-277 791
Plowshare project	S-39	TID-3522 (7th Rev.)
Pluto	S-1	PB-165 945
Polymyxins	S-10	PB-165 950
Potassium	S-15	N64-18293
Postasium chloride	S-10	PB-165 949
Preservation	S-25	TID-18285
Pressure vessels	S-31	AD-428 856
Probability	S-23	PB-166 020
Programming (Computers)	S-29	PB-165 968
		PB-165 969
		WAPD-TM-398
		WAPD-TM-407
	S-44	AD-405 145
		PB-165 327
	S-45	PB-166 021
	S-46	AD-409 607
Programming languages	S-46	AD-409 607
Propagation	S-44	PB-165 327
	S-45	NASA-TN-D-2071
Propellants	S-14	AD-431 013
Proteins	S-11	PB-165 955
Protons	S-14	N64-18437
Pseudomonas	S-8	PB-165 953
Psychometrics	S-2	PB-165 905
Psychophysiology	S-3	PB-165 962
Pyruvic acid	S-10	PB-165 949
QL chemical warfare agents	S-42	AD-437 257
Radar antennas	S-20	PB-166 024
Radiation chemistry	S-38	NYO-10025
Radiation effects	S-11	PB-165 896
	S-12	PB-165 944
		PB-165 951
Radiation hazards	S-11	PB-165 896
Radio waves	S-44	PB-165 327
Radioactivation analysis	S-39	NYO-10174
Radioactive isotopes	S-11	PB-165 896
Radioprotective agents	S-9	PB-165 920
	S-10	PB-165 903
Radiotherapy	S-11	ORINS-43
Reactor breeding blankets	S-40	APDA-156
Reactor coolants	S-13	IDO-11006
Reactor engineering	S-40	GEAP-4203
Reactor fuel cladding	S-40	GEAP-4351
Reactor fuel elements	S-40	GEAP-4351
	S-41	GEAP-4400
RECAP-1	S-29	WAPD-TM-407
Re-entry vehicles	S-23	NASA-TN-D-2053
		NASA-TN-D-2270
Refractory materials	S-26	AD-420 569
Refractory metal alloys	S-37	AD-422 116
Reserpine	S-10	PB-165 949
Resistance thermometers	S-44	NASA-CR-26
Respiratory system	S-9	AD-430 123
Retina	S-8	PB-165 890
	S-9	PB-165 943
Rhythm (Biology)	S-2	NASA-SP-5007
Rocket igniters	S-27	AD-414 730
Rocket motors (Liquid propellant)	S-24	AD-418 644
Rocket tossing	S-24	PB-166 019
Rockets	S-24	PB-166 017
Rubidium	S-26	AD-434 544
Russian-English coding	S-46	AD-409 607
Russian-English (Machine translation)	S-45	PB-166 021
Safety	S-24	AD-418 644
	S-38	ORNL-3479
Saline ground water	S-18	PB-181 680
Saliva	S-10	PB-165 941
Salts	S-13	IS-667
Satellites (Artificial)	S-2	AD-433 237
Savannah river plant	S-2	TID-19562
Scientific organications	S-45	PB-181 679
Scientific research	S-38	ORNL-3499 (Vol. II)
	S-47	PB-181 563
Sea water	S-14	PB-181 685
	S-18	PB-165 307
		PB-181 680
		PB-181 684
		PB-181 686
		PB-181 687
	S-19	PB-181 681
		PB-181 682
		PB-181 683
Semicircular canals	S-8	PB-165 904
Semiconductor devices	S-44	AD-405 517
Semiconductors	S-39	N64-18291
	S-44	AD-405 145
Servo amplifiers	S-21	PB-181 691
		PB-181 692
Shells (Geometry)	S-29	WAPD-TM-398
Shock waves	S-31	AD-428 843
	S-32	NASA-TR-R-171
	S-42	AD-437 257
Short take-off planes	S-16	AD-428 236
Silicon	S-44	AD-405 145
Simulation	S-29	PB-165 969
Skin	S-3	PB-165 894
Snow removal	S-26	PB-166 012
Snow vehicles	S-26	PB-166 012
Snowplow gates	S-26	PB-166 012
Sodium chloride	S-18	PB-181 687
Sodium tetrathionate	S-10	PB-165 950
Soil mechanics	S-19	AD-272 653
Soils	S-19	AD-272 653
Solar radiation	S-1	PB-165 945
Soldering	S-35	TID-3577
Solid rocket propellants	S-27	PB-166 029
Solid state physics	S-44	AD-405 517
Solvent extraction	S-38	ORNL-3518
Solvents	S-27	AD-280 640
Sonar equipment	S-42	PB-166 018
Sound transmission	S-5	PB-165 910
Sounding rockets	S-15	PB-165 965
		PB-166 037
	S-32	AD-416 485
Space biology	S-2	AD-433 237
Space flight	S-5	PB-165 934
Space medicine	S-2	PB-166 033
	S-7	PB-165 898
Space propulsion	S-25	NASA-TN-D-2172
Space stations	S-23	NASA-TR-R-155
Specific heat	S-32	NASA-TR-R-171
Spectroscopy	S-44	AD-405 517
Spin	S-23	NASA-TR-R-155
Squid project	S-14	AD-429 500
	S-43	AD-429 501
		AD-429 502
Stability	S-32	NASA-TN-D-2282
Stabilizers (Horizontal tail surface)	S-32	AD-280 048
301 Stainless steel	S-36	AD-429 782
Stainless steel	S-36	AD-429 782
Stars	S-1	AD-430 646
Statistical analysis	S-29	PB-165 968
Steel	S-36	AD-432 317
Storage	S-26	PB-166 036
Storage tanks	S-20	PB-165 324
Stratosphere	S-15	PB-166 037
Stress (Phsiology)	S-3	N64-18421
	S-8	PB-165 890
Stresses	S-29	WAPD-TM-398
Structural shells	S-30	PB-166 007
	S-31	AD-428 856
Subject indexing	S-2	PB-166 002
Submarine hulls	S-36	AD-432 317
Subsonic flow	S-31	AD-279 634
Succinates	S-10	PB-165 949
Superaerodynamics	S-32	AD-433 613
Superconductivity	S-43	PB-166 023
Superconductors	S-43	PB-166 023
Switching circuits	S-28	AD-428 087
Syncope	S-6	PB-165 897
24S-T3 Al alloy	S-36	AD-429 782
90 Ta-10W alloy	S-37	AD-422 116
Tables	S-30	AD-425 027
	S-33	AD-280 874
Tanks (Containers)	S-30	PB-166 007
Tantalum alloys	S-37	AD-422 116
Teeth	S-7	PB-165 923
		PB-166 006
	S-12	PB-165 884
		PB-165 899
Telemeter systems	S-20	PB-165 963
Terminal ballistics	S-24	PB-166 016
Terrestrial magnetism	S-14	N64-17789
	S-15	PB-165 967
Test equipment	S-2	PB-165 905
Test facilities	S-31	AD-279 325
Test sets	S-20	PB-181 689
		PB-181 693
	S-21	PB-181 688
		PB-181 691
		PB-181 692
Thermal diffusion	S-18	PB-181 687
Thermal radiation	S-44	PB-166 031
	S-45	PB-165 325
Thermochemistry	S-14	PB-181 685
Thermodynamics	S-43	PB-166 023
Three-dimensional flow	S-33	AD-423 662
Thresholds (Physiology)	S-6	PB-165 958
Ti-6Al-2Mo alloy	S-36	AD 432 317
Ti-7Al-2Mo alloy	S-36	AD-432 317
Time studies	S-17	AD-425 627
		AD-425 712
Titanium alloys	S-36	AD-432 317
Tolerances (Physiology)	S-4	PB-165 954
Torpedo attack	S-24	PB-166 019
Toss bombing	S-24	PB-166 019
Tracking	S-25	PB-166 030
Trailblazer	S-23	NASA-TN-D-2053
	S-	NASA-TN-D-2270
Training	S-1	PB-166 025
Training devices	S-1	PB-166 025
Transducers	S-2	NASA-SP-5007
Transfer of training	S-1	PB-166 025
Transferases	S-12	PB-165 951
Transport properties	S-42	NASA-TN-D-2279
Transportation	S-26	PB-166 036
TZM alloy	S-37	AD-422 116
Underground explosions	S-39	TID-3522 (7th Rev.)
Underwater explosions	S-35	AD-438 916
Underwater ordnance	S-24	PB-166 017
Underwater sound equipment	S-42	PB-166 018
Upper atmosphere	S-14	N64-17574
Upshot-knothole project	S-30	PB-166 007
Urea	S-5	PB-165 934
Ureides	S-10	PB-165 903
Urine	S-10	PB-165 941
Vertebrates	S-2	TID-19562
Vertical take-off planes	S-16	AD-428 236
	S-33	AD-417 969
	S-34	PB-165 347
Vestibular apparatus	S-5	PB-165 910
	S-8	PB-165 904
Vibration	S-3	PB-165 962
Vibrators (Electrical)	S-42	AD-434 675
Viscoelasticity	S-34	PB-165 971
Vocabulary	S-46	AD-299 384
Volir	S-20	PB-166 024
Volumetric indicating radar	S-20	PB-166 024
Vortices	S-33	AD-413 829
Warfare	S-23	PB-166 020
Waste processing	S-38	ORNL-3518
Water cooled reactors	S-40	GEAP-4203
Water waves	S-35	AD-418 237
Wave transmission	S-45	PB-165 325
Waveguides	S-22	PB-166 015
Weather stations	S-15	PB-165 965
Welding	S-36	AD-278 175
	S-37	AD-422 116
Wheel hubs	S-16	AD-279 581
Wings	S-33	AD-417.969
Wiped-film evaporators	S-18	PB-181 686
Wounds and injuries	S-8	PB-165 904
X rays	S-11	PB-166 005
γ-Aminobutyric acid	S-10	PB-165 949
Zircaloy-2	S-35	WAPD-275
Zirconium alloys	S-37	GEAP-4089 (Vol. I&II)
Zirconium compounds	S-26	AD-420 569
Zirconium oxide	S-26	AD-420 569

UNIVERSITY MICROFILMS INC
313 N FIRST STREET
ANN ARBOR MICHIGAN
GRR JUNE

UNITED STATES
GOVERNMENT PRINTING OFFICE
DIVISION OF PUBLIC DOCUMENTS
WASHINGTON, D.C. 20402

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, $300